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ABSTRACT

The islands of western Lake Erie are rock-bound isles that abound in rocky outcrops and quarries. The rocks of these islands are of two distinct types, Silurian dolomites and Devonian limestones. The dolomites, exposed in the Bass Islands and Sister Islands are virtually devoid of fossils. Conversely, the limestones of Johnson Island, Marblehead, Kelley's Island, and Pelee Island abound in Paleozoic fossils. The purpose of this report is to document the fossil fauna that has been reported for these islands and to compile a taxonomic list of the families and species of invertebrate fossils found in the island region of Lake Erie. This document includes published accounts and the results of personal investigations. A final section of the report contains 131 descriptions and illustrations of the important fossil taxa found in the rocks. (Author/CW)

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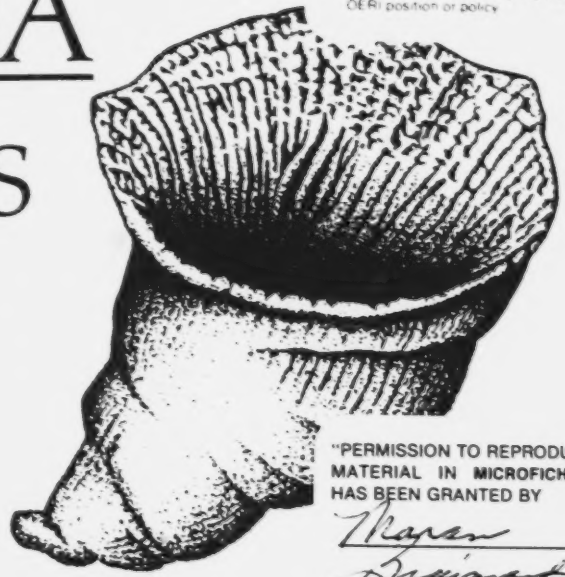

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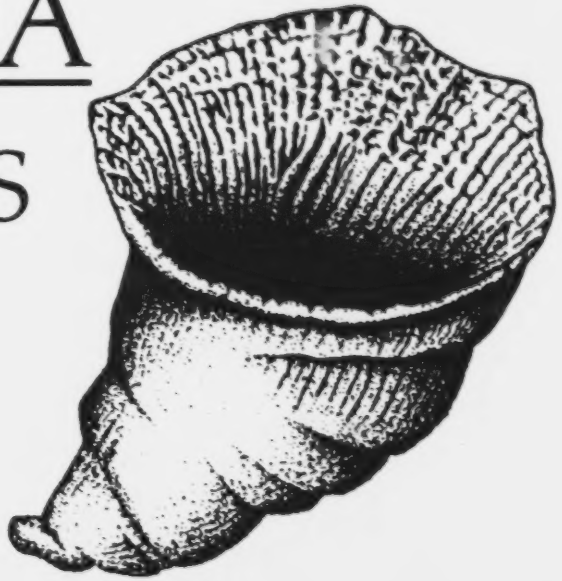

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The Ohio State University

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The islands of western Lake Erie are picturesque, rock-bound isles that abound in rocky outcrops and quarries. The rocks of these islands are of two distinct types, Silurian dolomites and Devonian limestones. The dolomites, exposed in the Bass Islands and Sister Islands are virtually devoid of fossils. Conversely, the limestones of the Johnson Island -- Marblehead -- Kelleys Island -- Pelee Island chain abound in Paleozoic fossils.

The purpose of this report is to document the fossil fauna that has been reported for these islands. Lulu M. Bowe has compiled a taxonomic list of the families and species of invertebrate fossils found in the island region of Lake Erie. This document not only includes published accounts, but the results of her individual investigations. A final section of the report contains 131 descriptions and illustrations of the important fossil taxa found in the rocks

On behalf of the Franz Theodore Stone Laboratory, I am pleased to receive this manuscript and make printed copies available to other researchers and students interested in fossils of the island region.

Charles E. Herdendorf, Director
Franz Theodore Stone Laboratory
The Ohio State University

ACKNOWLEDGEMENTS

My appreciation is extended to The Ohio State University offices of the Franz Theodore Stone Laboratory and Program 60 of Continuing Education. It is through these two programs that my knowledge of geology, especially of fossil fauna, has been extended.

Dr. Charles E. Herdendorf, Director of the Franz Theodore Stone Laboratory and my advisor and instructor for "Individual Studies in Geology" has guided me through the world of fossils, as well as Dr. Stig Bergstrom, Professor of Geology and Mineralogy, and Dr. Walter C. Sweet, Professor of Paleontology, both of The Ohio State University, Columbus campus.

Lulu M. Bowe
Program 60 Participant
The Ohio State University

INTRODUCTION

The purpose of this work is to compile a record, as complete as possible, of the fossils within the islands region of western Lake Erie. For the purpose of this compilation, the islands region includes the portion of Lake Erie and adjacent mainland with a 50 km radius. Gibraltar Island, the location of Stone Laboratory, lies near the heart of the islands region.

This book will prove useful to those familiar and unfamiliar with fossils. For those unfamiliar, the following definitions are provided.

Taxonomy. The science dealing with identification, naming and classification of organisms in a hierarchical system. There are seven major divisions in descending order with each category being a collective unit containing one or more levels from the next lower group.

Kingdom. The broadest class in a hierarchical system.

Species. The basic category of biological classification composed of related individuals that resemble one another and share a single ecological niche. Interbreeding is common with common ancestry.

Categories between kingdom and species are phylum, class, order, family and genus.

Flora. The collective term for all plant species that grow in a region.

Fauna. The collective term for all animals that live in a region.

Fossil. The impression, impregnated remains or trace of an animal or plant of a prior geologic age that has been preserved in the earth's crust.

A fossil collection is on display at the Visitor Center at The Ohio State University's Stone Laboratory at Put-in-Bay, Ohio. The code numbers in this book appearing in the table of contents and with the fossil descriptions correspond to the code numbers of this collection. The fossil list was used to study the Columbus Limestone Formation of the glacial grooves of Kelleys Island. It was compiled from publications by the authors listed in the bibliography.

Many of these fossils can also be seen in the Columbus Limestone of Central Ohio, in the limestone buildings and numerous outcrops in the area.

The fossils collected were categorized by either class or phylum depending on the quantity of fossils in the category.

SP	Stromatoporoidea	order
A	Anthozoa (corals)	class
BY	Bryozoa	phylum
BR	Brachiopoda	phylum
G	Gastropoda	class
T	Tentaculites	not classified
P	Pelecypoda	class
C	Cephalopoda	class
TR	Trilobita	class
BL	Blastoidea	class
CR	Crinoidea	class
SL	Stromatolites	not classified
TF	Trace Fossils	not classified

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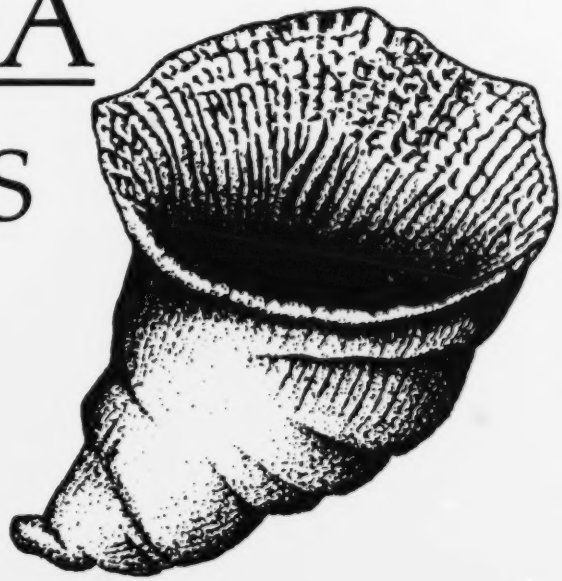

PHYLUM COELENTERATA
- Class Hydrozoa (hydroids)
  - Order Stromatoporoidea (stromatoporoids)
    - Family Clathrodictyidae
    - Family Stromatoporoidea
    - Family Syringostromatidae
- Class Anthozoa (corals)
  - Order Rugosa (wrinkled corals)
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1. Elytha fimbriata

Family Mucrospiriferidae
1. Brevispirifer gregarius
2. Mucrospirifer consobrinus
3. Mucrospirifer mucronatus

Family Nucleospiridae
1. Nucleospira concinna

Family Spiriferidae
1. Spirifer duodenarious (?)

Order Strophomenida
Family Chonetidae
1. Chonetes coronatus
2. Chonetes scitulus

Family Eodevonariidae
1. Eodevonaria arcuata

Family Leptaenidae
1. Leptaena rhomboidalis

Family Productellidae
1. Productella spinulicosta

Family Stropheodontidae
1. Megastrophia concava
2. Megastrophia hemisphaerica
3. Stropheodonta demissa
4. Strophonella ampla

Order Terebratulida
Family Cranaenidae
1. Eunella sp.

PHYLUM MOLLUSCA
Class Gastropoda (snails)
Order Archaeogastropoda
Family Anomphalidae
1. Isonema humile

Family Elasmonematidae
1. Elasmonema bellatulum

Family Eotomariidae
1. Bembexia adjutor
2. Mourlonia lucina

Family Euomphalidae
1. Pleuronotus decewi

Family Murchisoniidae
1. Coelocaulus macrospira
2. Murchisonia desiderata

Family Neritopsidae
1. Naticopsis sp.

Family Palaeotrochidae
1. Palaeotrochus kearneyi
2. Turbonopsis shumardi

Family Platyceratidae
1. Naticonema lineata
2. Platyceras dumosum
3. Ptychospirina varians

Family Porcelliidae
1. Porcellia sciota

Order Caenogastropoda
Family Sublitidae
1. Soleniscus hebe

Family Loxonematidae
1. Loxonema hamiltoniae

Family Turritellidae
1. Acanthonema newberryi

Mollusca Incertae Sedis
1. Tentaculites scalariformis

Class Bivalvia (Pelecopoda) (clams)
Order Conocardioida
Family Conocardiidae
1. Conocardium cuneus

Order Modiomorphoida
Family Modiomorphidae
1. Modiomorpha concentrica

Order Pholadomyoida
Family Grammysiidae
1. Sanguinolites sanduskiensis

Order Pterioida
Family Aviculopectinidae
1. Aviculopecten cleon

Family Pterineidae
1. Actinoptera boydi

Order Trigonioida
Family Myophoriidae
1. Schizodus appressus

Order Veneroida
Family Mactromyidae
1. Paracyclas elliptica

Class Cephalopoda (cephalopods)
Order Actinocerida (nautiloids)
Family Huroniidae
1. Huronia bigsbyi

Family Ormoceratidae
1. Ormoceras winchelli

Order Ammonoidea (ammonoids)
Family Tornoceratidae
1. Tornoceras uniangulare

Order Bactritida (primitive ammonoids)
Family Bactritidae
1. Bactrites arkonensis

Order Barrandeocerida (nautiloids)
Family Nephriticeratidae
1. Gigantoceras inelegans
2. Nephriticerina metula

Order Ellesmerocerida (nautiloids)
Family Protocycloceratidae
1. Orygoceras cornuoryx

Order Nautilida (nautiloids)
Family Centroceratidae
1. Centroceras ohioense

Family Rutoceratidae
1. Ryticeras cyclops
2. Tylorthoceras ohioense

Family Tetragonoceratidae
1. Nassauoceras seminodosus

Order Oncocerida (nautiloids)
Family Acleistoceratidae
1. Acleistoceras hyatti

Order Orthocerida (nautiloids)
Family Pseudorthoceratidae
1. Spyroceras thoas

PHYLUM ARTHROPODA
Class Trilobita (trilobites)
Order Phacopida
Family Dalmanitidae
1. Anchiopsis anchiops
2. Coronura aspectans
3. Odontocephalus sp.
4. Trypaulites calypso

Family Phacopidae
1. Phacops cristata

Order Ptychopariidae
Family Proetidae
1. Proetus rowi

PHYLUM ECHINODERMATA
Class Blastoidea (blastoids)
Order Fissiculata
Family Codasteridae
1. Codaster pyramidatus

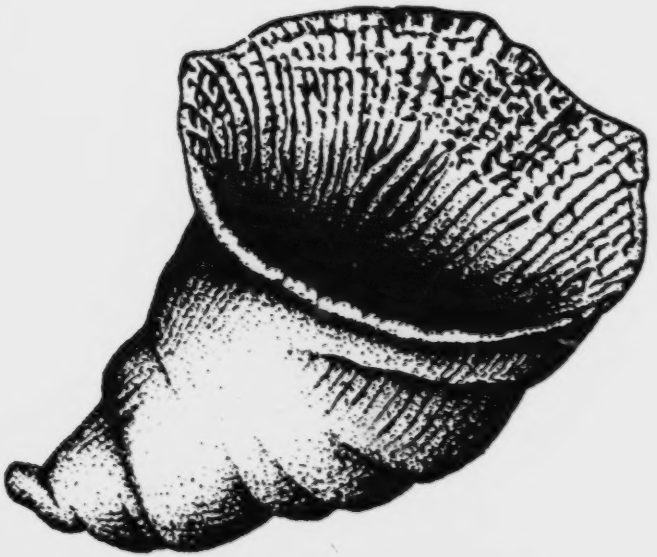
Order Spiraculata
Family Nucleocrinidae
1. Nucleocrinus verneuili

Class Crinoidea (crinoids)
Order Monobathrida
Family Dolatocrinidae
1. Dolatocrinus sp.

Family Melocrinitidae
1. Melocrinites onondaga
2. Crinoid stem
3. Crinoid columnals

Unclassified fossils

1. Stromatolites
2. Clam molds and casts
3. Worm burrows?



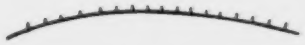
FOSSILS

SP1a - Stromatopora ponderosa

Stromatopora: Coenosteum massive, hemispherical or irregular, and as much as half a meter in diameter; laminae grouped into latilaminae; radial pillars numerous, extending across a stratum and uniting with the laminae to form finely reticulated tissue as seen in transverse section; mamelons and astrorhizae commonly present.
S. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 19.

Stromatopora: Structure has parallel layers, without the pillars of Stylodictyon and Syringostroma; star-shaped groups of radiating grooves can often be seen on the surface, and sometimes rounded bumps.
S. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 75.

S. ponderosa: Specimens designated S. ponderosa in the Orton Museum, OSU, Columbus, Ohio, have thin, parallel layers which extend across strata; very tiny bumps cover the surface between the layers.

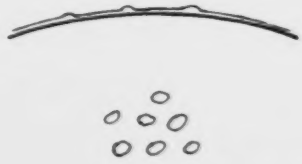


SP1b - Stromatopora substrialella

Stromatopora: Coenosteum massive, hemispherical or irregular, and as much as a half meter in diameter; laminae grouped into latilaminae; radial pillars numerous, extending across a stratum and uniting with the laminae to form finely reticulated tissue as seen in transverse section; mamelons and astrorhizae commonly present.
S. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 19.

Stromatopora: Structure has parallel layers, without the pillars of Stylodictyon and Syringostroma; star-shaped groups of radiating grooves can often be seen on the surface, and sometimes rounded bumps.
S. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 75.

S. substrialella: Specimens designated S. substrialella in the Orton Museum, OSU, Columbus, Ohio, have thin parallel layers which extend across the strata; small bumps cover the surface between the layers, of the size shown below.

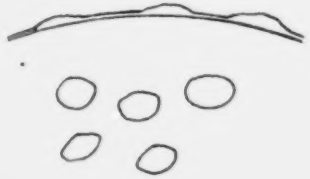


SPIc - Stromatopora sanduskiensis

Stromatopora: Coenosteum massive, hemispherical or irregular, and as much as a half meter in diameter; laminae grouped into latilaminae; radial pillars numerous, extending across a stratum and uniting with the laminae to form finely reticulated tissue as seen in transverse section; mamelons and astrorhizae commonly present.
S. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 19.

Stromatopora: Structure has parallel layers, without the pillars of Stylodictyon and Syringostroma; star-shaped groups of radiating grooves can often be seen on the surface, and sometimes rounded bumps.
S. sp.: LaRocque an Marple, Ohio Fossils (1955), p. 75.

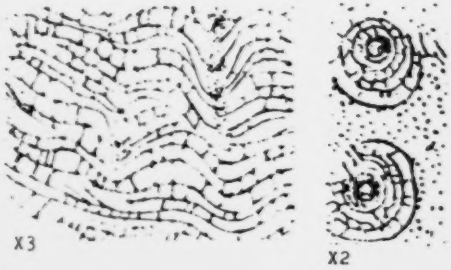
S. sanduskiensis: Specimens designated S. sanduskiensis in the Orton Museum, OSU, Columbus, Ohio, have thin, parallel layers which extend across the strata; rounded bumps of the size below are found on the surface of these layers; openings on the reverse side of the layers show where these rounded bumps fit into the colonial layers.



SP2 - Stylodictyon columnare Nicholson and Murie

Stylodictyon: Coenosteum a dense tissue traversed by numerous closely set circular vertical columns of large size, formed by the upward bending of concrete laminae which terminate at the surface in small pointed eminences; tissue more open between columns and consisting of horizontal laminate and radial pillars (often imperfect).
S. columnare: Shimer and Shrock, Index Fossils (1944), Pl. 18.

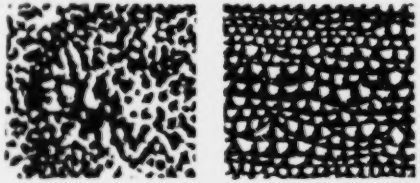
Stylodictyon: Regular pillar-like structure shows in cross section which is caused by the upending of the successive layers; pillars continuous throughout most of the thickness of colony.
S. columnare: LaRocque and Marple, Ohio Fossils (1955), p. 75.



SP3 - Syringostroma densa Nicholson

Syringostroma: Differs from Stromatopora in its denser structure and thinner laminae.
S. densum: Shimer and Shrock, Index Fossils (1944), Pl. 19.

Syringostroma: Has larger pillars than Stylodictyon, but they are less persistent.
S. densa: LaRocque and Marple, Ohio Fossils (1955), p. 75.



X2

A1a - Aulopora expatiata

Aulopora: Corallum composed of small tubes; adnate, prostate, or prostate basally with erect or more probably pendant compound branches; tubes calcareous; corallites not continuously united except in rare cases.
A. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 40.

Aulopora: Corals in colonies of many individuals; do not grow in colonies of parallel tubes; tubes arranged serially; tubes branch out from each other in a network of cells.
A. expatiata: LaRocque and Marple, Ohio Fossils (1955), p. 76.

A1b - Aulopora conferta Winchell

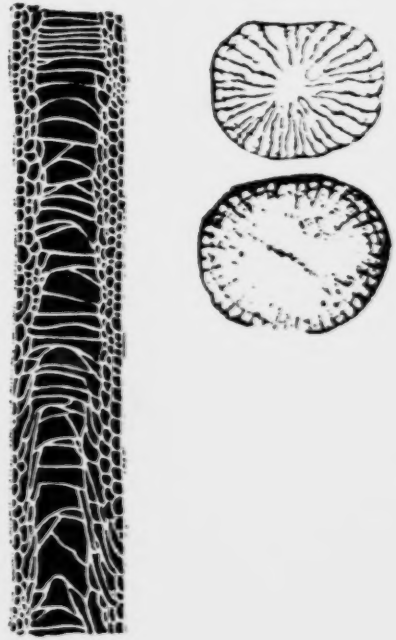
Aulopora: Corallum composed of small tubes; adnate, prostate, or prostate basally with erect or more probably pendant compound branches; tubes calcareous; corallites not continuously united except in rare cases.
A. conferta: Shimer and Shrock, Index Fossils (1944), Pl. 40.

Aulopora: Corals in colonies of many individuals; do not grow in colonies of parallel tubes; tubes arranged serially; tubes branch out from each other in a network of cells.
A. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 76.

A2 - Cylindrophyllum propinquum

Cylindrophyllum: Phaceloid rugose corals with marginal and nonparricidal budding; epitheca thin, annulated; calices deep; septa major and minor, major may reach axis; septal grooves distinct; carinae numerous; outer zone composed of strongly arched dissepiments, which tend to be arranged in vertical rows; inner zone occupied by complete and incomplete tabulae.
C. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 30.

Cylindrophyllum: Corals in colonies of many individuals; tubes arranged in parallel masses; colonies hemispherical or honeycomb-like; tubes round or elliptical in outline; edges of cups not joined together; tubes free except where one branches off from another; similar to Eridophyllum but cups are not joined together.
C. propinquum: LaRocque and Marple, Ohio Fossils (1955), p. 77.



A3a - Cystiphyllum(?) sulcatum Billings

Cystiphyllum: Coralla simple or compound, varying from depressed turbinate to cylindrical or irregular form; entire interior of corallum filled with vesiculose material with a conical arrangement of vesicles; calyx without septa or with only faint ridges; strongly wrinkled epitheca present.
C.(?) sulcatum: Short, conical and curved corallum, with a deep cardinal fossula; septa represented by coarse plications of calyx floor. Shimer and Shrock, Index Fossils (1944), Pl. 33.

Cystiphyllum: Solitary corals; horn-shaped; septa not prominent; cup with numerous blister-like growths.
C. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 78.

A3b - Cystiphyllum americanum Edwards and Haime

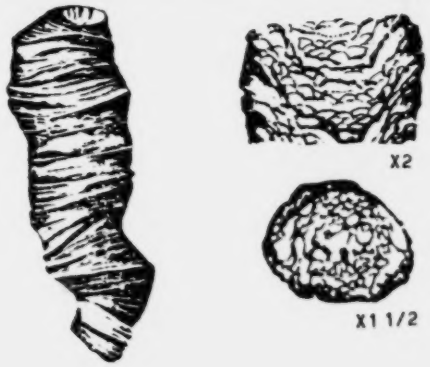
Cystiphyllum: Coralla simple or compound, varying from depressed turbinate to cylindrical or irregular form; entire interior of corallum filled with vesiculose material with a conical arrangement of vesicles; calyx without septa or with only faint ridges; strongly wrinkled epitheca present.
C. americanum: Large, cylindrical, frequently constricted, covered with thin but strongly wrinkled epitheca; calyx with faint indication of septa; vesicular material coarsest near center. Shimer and Shrock, Index Fossils (1944), Pl. 33.

Cystiphyllum: Solitary corals; horn-shaped; septa not prominent; cup with numerous blister-like growths.
C. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 78.

A3c - Cystiphyllum conifollis Hall

Cystiphyllum: Coralla simple or compound, varying from depressed turbinate to cylindrical or irregular form; entire interior of corallum filled with vesiculose material with a conical arrangement of vesicles; calyx without septa or with only faint ridges; strongly wrinkled epitheca present.
C. conifollis: Slender, cylindrical, with periodic constrictions; cysts arranged radially at base of calyx. Shimer and Shrock, Index Fossils (1944), Pl. 33.

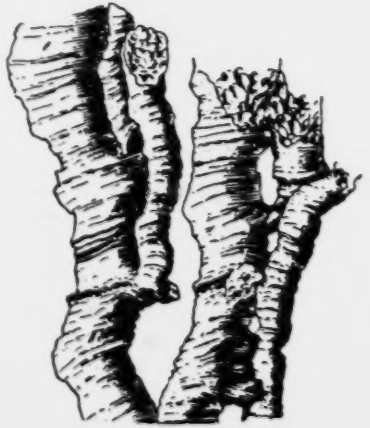
Cystiphyllum: Solitary corals; horn-shaped; septa not prominent; cup with numerous blister-like growths.
C. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 78.



A3d - Cystiphyllum aggregatum Billings

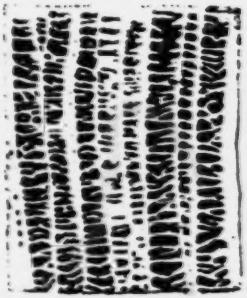
Cystiphyllum: Coralla simple or compound, varying from depressed turbinate to cylindrical or irregular form; entire interior of corallum filled with vesiculose material with a conical arrangement of vesticles; calyx without septa or with only faint ridges; strongly wrinkled epitheca present.
C. aggregatum: Compound corallum composed of closely crowded corallites attached to one another by elliptical proliferations. Shimer and Shrock, Index Fossils (1944), pl. 33.

Cystiphyllum: solitary corals; horn-shaped; septa not prominent; cup with numerous blister-like growths.
C. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 78.

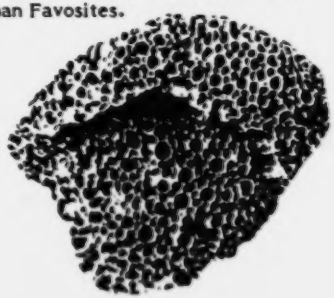


A4a - Emmonsia emmonsi (Hall)

Emmonsia: Like Favosites but with tabulae degenerate, chiefly represented by discrete, flattened projections (squamulae) which appear as spines in longitudinal section.
E. emmonsi: Characterized by two to three rows of pores on each coralite face and marginally thickened squamulae. Shimer and Shrock, Index Fossils (1944), Pl. 38.



Emmonsia: Corals in colonies of many individuals; tubes arranged in parallel masses; colonies hemispherical or honeycomb-like; tubes polygonal in outline; tubes all smaller than 3/16 inch in diameter; tubes more irregular in size than Favosites.
E. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 77.



A4b - Emmonsia tuberosa (Rominger)

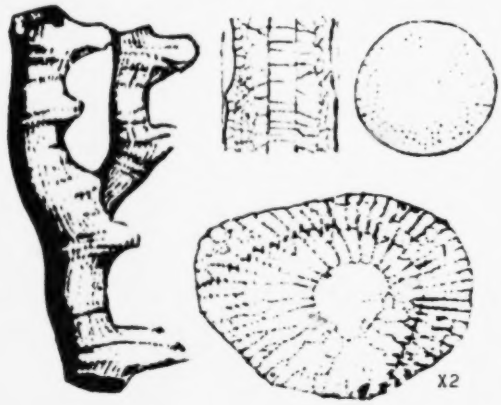
Emmonsia: Like Favosites but with tabulae degenerate, chiefly represented by discrete, flattened projections (squamulae) which appear as spines in longitudinal section.
E. tuberosa: Corallites of medium size (2 to 3 mm in diameter); two to three rows of mural pores on each face, and two rows of stout horizontal squamae on inside of each face; squamae of adjoining rows alternating and often interlocking; pores surrounded by small pits; many corallite openings are closed by concave, concentrically wrinkled opercula. Shimer and Shrock, Index Fossils (1944), Pl. 38.

Emmonsia: Corals in colonies of many individuals; tubes arranged in parallel masses; colonies hemispherical or honeycomb-like; tubes polygonal in outline; tubes all smaller than 3/16 inch in diameter; tubes more irregular than Favosites.
E. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 77.

A5a - Eridophyllum seriale Edwards and Haime

Eridophyllum: Compound rugose corals typically phaceloid, with axial edges of major septa bent at right angles and fused to form a tube or aulos; septa thin, carinate, with carinae on the two sides of septa in line; tabulae, divided by the aulos into an axial and periaxial series, are horizontal and widely spaced; dissepiments globose, fine, numerous.
E. seriale: Characterized by widely separated corallites united by strong lateral outgrowths. Shimer and Shrock, Index Fossils (1944), Pl. 27.

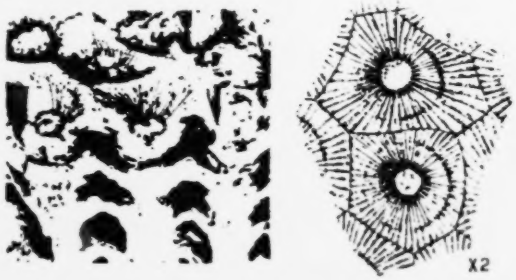
Eridophyllum: Corals in colonies of many individuals; tubes arranged in parallel masses; colonies hemispherical or honeycomb-like; tubes round or elliptical in outline; edges of cups joined together by ring-like expansions; similar to Cylindrophyllum, but cups joined together.
E. sp.: LaRocque and Marple, Ohio Fossils (1953), p. 77.



A5b - Eridophyllum colligatum (Billings)

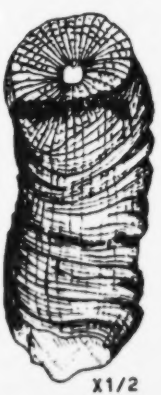
Eridophyllum: Compound rugose corals typically phaceloid, with axial edges of major septa bent at right angles and fused to form a tube or aulos; septa thin, carbinate, with carinae on the two sides of septa in line; tabulae, divided by the aulos into an axial and periaxial series, are horizontal and widely spaced; dissepiments globose, fine, numerous.
E. colligatum: Outgrowths from corallites occur at same level in adjacent corallites and meet to form successive platforms at which levels the corallites are prismatic; elsewhere they are cylindrical. Shimer and Shrock, Index Fossils (1944), Pl. 27.

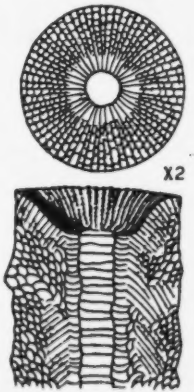
Eridophyllum: Corals in colonies of many individuals; tubes arranged in parallel masses; colonies hemispherical or honeycomb-like; tubes round or elliptical in outline; edges of cups joined together by ring-like expansions; similar to Cylindrophyllum, but cups joined together.
E. sp.: LaRocque and Marple, Ohio Fossils (1953), p. 77.



A5c - Eridophyllum archiaci (Billings)

Eridophyllum: Compound rugose corals typically phaceloid, with axial edges of major septa bent at right angles and fused to form a tube or aulos; septa thin, carinate, with carinae on the two sides of septa in line; tabulae, divided by the aulos into an axial and periaxial series, are horizontal and widely spaced; dissepiments globose, fine, numerous.
E. archiaci: Corallites usually touching, without outgrowths, sometimes becoming prismatic from crowding; inner wall horseshoe-shaped. Shimer and Shrock, Index Fossils (1944), Pl. 27.





Eridophyllum: Corals in colonies of many individuals; tubes arranged in parallel masses; colonies hemispherical or honeycomb-like; tubes round or elliptical in outline; edges of cups joined together by ring-like expansions; similar to Cylindrophyllum, but cups joined together.
E. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 77.

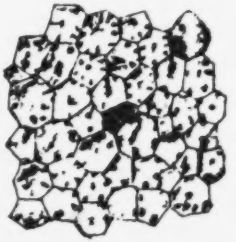
A6a - Favosites hemispherica

Favosites: Corallum branched, expanded or massive; corallites prismatic, thin-walled, in contact but not amalgamated; corallite walls perforated by pores; septa absent or represented by ridges or rows of spines; tabulae dominantly complete and approximately horizontal.
F. hemispherica: Corallum turbanlike; generally curved in basal portions; corallites curve outward, with their mouths nearly perpendicular to main axis of corallum, average one to two mm in diameter; pores generally in single rows; tabulae complete, average 1.5 mm apart; squamae not generally present. Shimer and Shrock, Index Fossils (1944), Pl. 37.

Favosites: Corals in colonies of many individuals; arranged in parallel masses; colonies hemispherical or honeycomb-like; tubes polygonal in outline; tubes are smaller than 3/16 inch diameter; similar to Emmonsia but tubes are more regular in size.
F. sp.: LaRocque an Marple, Ohio Fossils (1955), p. 59, 77.

A6b - Favosites hamiltoniae Hall

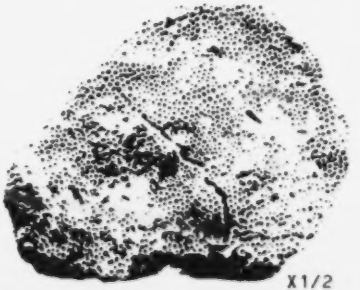
Favosites: Corallum branched, expanded or massive and commonly half a meter in diameter; corallites prismatic, thin-walled, in contact but not amalgamated; corallite walls perforated by pores; septa absent or represented by ridges or rows of spines, their condition varying greatly within individual coralla and corallites in some cases, but uniform for species in others; tabulae dominantly complete and approximately horizontal.
F. hamiltoniae: Corallum a hemispherical head with base covered by wrinkled peritheca; adult corallites up to 2.5 mm in diameter; generally surrounded by smaller immature ones; mural pores in two rows, frequently obscure; tabulae perfect, sometimes crowded, more generally 2 to 4 mm apart, not infrequently with marginal notches; easily recognized by perfect tabulae. Shimer and Shrock, Index Fossils (1944), Pl. 37.



Favosites: Corals in colonies of many individuals; arranged in parallel masses; colonies hemispherical or honeycomb-like; tubes polygonal in outline; tubes are smaller than 3/16 inch in diameter; similar to Emmonsia but tubes are more regular in size.
F. sp.: LaRocque an Marple, Ohio Fossils (1955), p. 59.

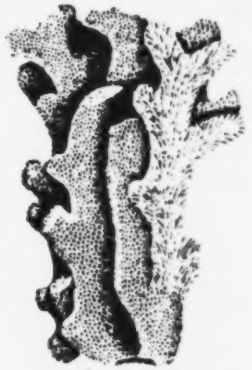
A6c - Favosites placenta Rominger

Favosites: Corallum branched, expanded or massive and commonly half a meter in diameter; corallites prismatic, thin-walled, in contact but not amalgamated; corallite walls perforated by pores; septa absent or represented by ridges or rows of spines, their condition varying greatly within individual coralla and corallites in some cases, but uniform for species in others; tabulae dominantly complete and approximately horizontal.
F. placenta: Corallum a broad, generally thin undulating expansion with base covered by wrinkled epitheca; corallites less than 1 mm in diameter with clusters of smaller ones scattered about; in some specimens (especially young ones) the larger corallites are cylindrical and widely separated; tabulae of smaller corallites simple, of larger ones squamous; pores uniserial. Shimer and Shrock, Index Fossils (1944), Pl. 37.



Favosites: Corals in colonies of many individuals; arranged in parallel masses; colonies hemispherical or honeycomb-like; tubes polygonal in outline; tubes are smaller than 3/16 inch in diameter; similar to Emmonsia, but tubes are more regular in size.
F. sp.: LaRocque an Marple, Ohio Fossils (1955), p. 59.

A6d - Favosites limitaris Rominger



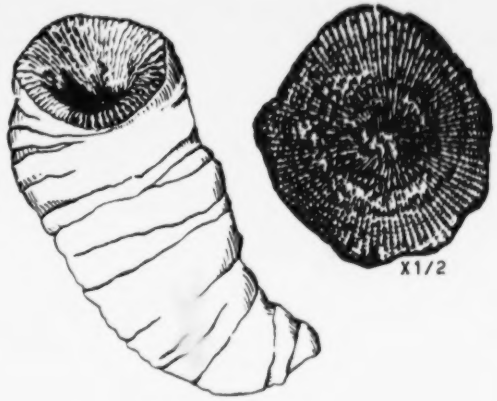
Favosites: Corallum branched, expanded or massive and commonly half a meter in diameter; corallites prismatic, thin-walled, in contact but not amalgamated; corallite walls perforated by pores; septa absent or represented by ridges or rows of spines, their condition varying greatly within individual coralla and corallites in some cases, but uniform for species in others; tabulae dominantly complete and approximately horizontal.
F. hemispherica: Corallum cylindrical, commonly branching stem 10 to 5 mm in diameter; corallites circular in section, opening about perpendicularly to axis of branch; walls thick; the division lines between corallites shown only in certain states of preservation. Shimer and Shrock, Index Fossils (1944), Pl. 37.

Favosites: Corals in colonies of many individuals; arranged in parallel masses; tubes polygonal in outline.
F. sp.: LaRocque and Marple, Ohio Fossils (1955).

A8 - Heliophyllum halli Edwards and Haime

Heliophyllum: Like Cyathophyllum, but with septa thickened on their sides by opposite vertical carinae, which are few and weak in young or primitive species, but numerous and strong in others.
H. halli: Broadly turbinate at base or in young specimens, becoming cylindrical in old individuals, frequently with irregular constrictions showing rejuvenescence; epitheca strongly wrinkled. Shimer and Shrock, Index Fossils (1944), Pl. 31.

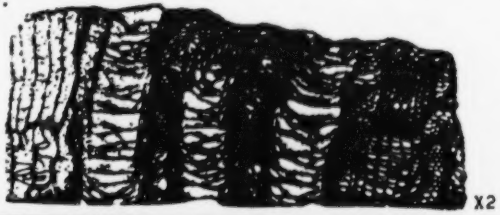
Heliophyllum: Solitary coral; horn-shaped; septa prominent, numerous; septa with wavy edges; septa slightly twisted at center; fine coral with deep, regular cup and many septa.
H. halli: LaRocque and Marple, Ohio Fossils (1955), p. 78.

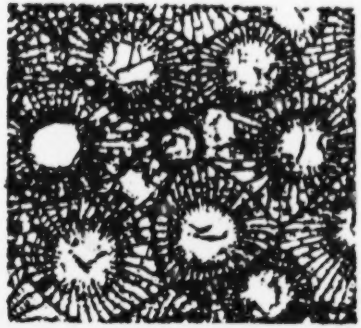


A9a - Hexagonaria anna (Whitfield)

Hexagonaria: Corallum composed of prismatic corallites in contact and of essentially equal diameter for entire length; similar to Heliophyllum in internal structure.
H. anna: Differs from H. prisma by numerous carinae and by abrupt termination of septa before reaching center. Shimer and Shrock, Index Fossils (1944), Pl. 30.

Hexagonaria: Corals in colonies of many individuals; tubes arranged in parallel masses; colonies hemispherical or honeycomb-like; tubes large (some as much as 3/8 inch in diameter).
H. sp.: LaRocque and Marple (1955), p. 77.

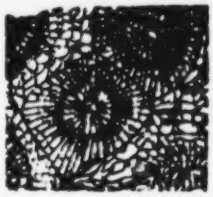




A9b - Hexagonaria prisma (Lang and Smith)

Hexagonaria: Corallum composed of prismatic corallites in contact and of essentially equal diameter for entire length; similar to Heliophyllum in internal structure.
H. prisma: Corallum relatively large, carinae few, and septa abundant; major septa continue to center of corallite instead of terminating at the edge of central tabulate zone. Shimer and Shrock, Index Fossils (1944), Pl. 30.

Hexagonaria: Corals in colonies of many individuals; tubes arranged in parallel masses; colonies hemispherical or honeycomb-like; tubes large (some as much as 3/8 inch in diameter).
H. sp.: LaRocque and Marple (1955), p. 77.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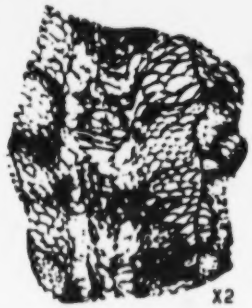
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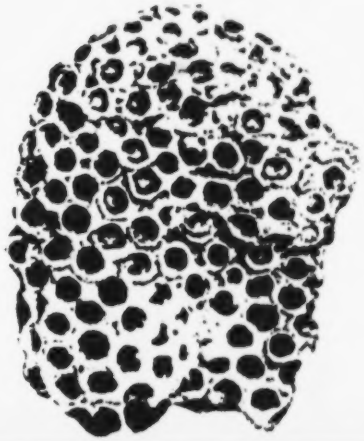
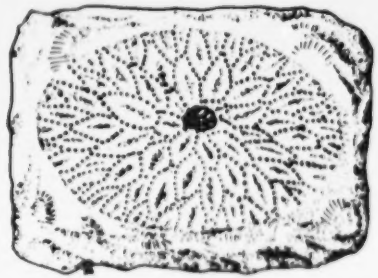
A10a - Pleurodictyum cylindricum (Michelin)

Pleurodictyum: Corallum depressed, discoidal, with lower surface covered with concentrically wrinkled peritheca; corallites small, prismatic, funnel-shaped; septa faint or obsolete; scanty development of tabulae; mural pores irregularly distributed.
P. cylindricum: Corallum 10 to 12.4 cm (4 to 5 inches) in diameter; corallites subcylindrical, averaging about 3 mm in diameter; on the interior are regular annulations which occupy the same level in adjoining tubes; principal tabulae numerous, slightly arched, united with incomplete ones. Shimer and Shrock, Index Fossils (1944), Pl. 40.

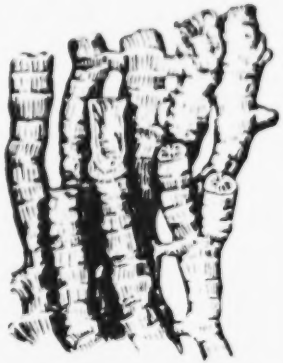


A10b - Pleurodictyum problematicum Goldfuss



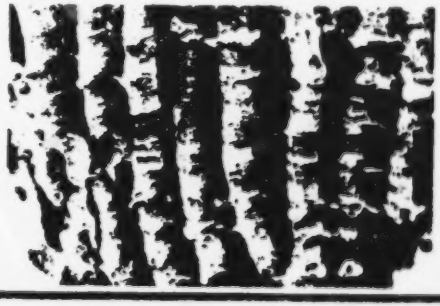
Pleurodictyum: Corallum depressed, discoidal, with lower surface covered by concentrically wrinkled peritheca; corallites small, prismatic, funnel-shaped; septa faint or obsolete; scanty development of tabulae; mural pores irregularly distributed; young corallites as in Aulopora. Treatise Part F, p. 566

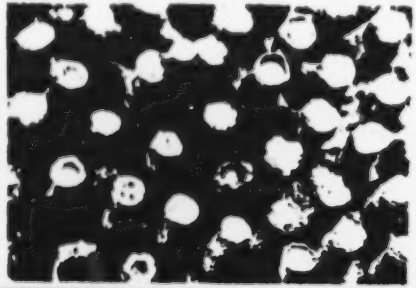
A11 - Synaptophyllum simcoense (Billings)



Synaptophyllum: Like Eridophyllum, but without the central wall, the septa extending across the tabulate area to near center; cylindrical; proliferations proceeding from all sides of corallites; distinguished by digitate septa and usually strong carinae.
S. simcoense: Corallites averaging 4 mm in diameter and distant about the same amount; septa 40 to 50. Shimer and Shrock, Index Fossils (1944), Pl. 30.

Synaptophyllum: Corals in colonies of many individuals; tubes arranged in parallel masses; colonies hemispherical or honeycomb-like; tubes round or elliptical in outline; edges of cups not joined together; tubes free, joined by distinct crossbars; diameter of tubes more than 1/8 inch; similar to Syringopora but tubes are larger.
S. simcoense: LaRocque and Marple, Ohio Fossils (1955), p. 77.

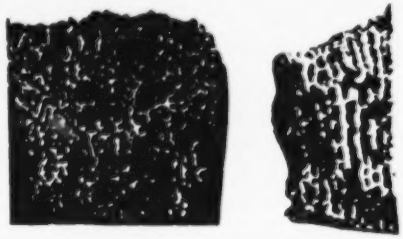




A12a - Syringopora hisingeri Billings

Syringopora: Corallum consisting of numerous cylindrical corallites, which grow parallel but generally separated, and have at intervals a few transverse tubular connecting processes; interior of corallite filled with funnel-shaped tabulae; septa are represented by spines.
S. hisingeri: Corallites are slender tubes less than 1 mm in diameter, separated by about their own width; frequent connecting tubes present. Shimer and Shrock, Index Fossils (1944), Pl. 42.

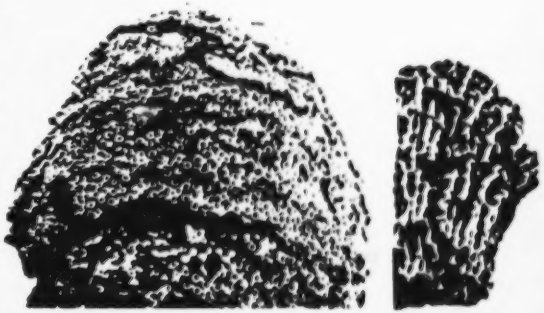
Syringopora: Corals in colonies of many individuals; tubes arranged in parallel masses; colonies hemispherical or honeycomb-like; tubes round or elliptical in outline; edges of cups not joined; tubes free, joined by distinct crossbars; diameter of tubes less than 1/8 inch; similar to Synaptophyllum but smaller; suggests a mass of spaghetti with crossbars joining the tubes at right angles; crossbars are numerous and never continue upward to form a new cup; they form a right angle, while budding individuals form an acute angle.
S. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 77.



A12b - Syringopora tabulata Edwards and Haime

Syringopora: Corallum consisting of numerous cylindrical corallites, which grow parallel but generally separated, and have at intervals a few transverse tubular connecting processes; interior of corallite filled with funnel-shaped tabulae; septa represented by spines.
S. tabulata: Corallites slender as in S. hisingeri, but closer together and parallel; connecting tubes at uniform levels, giving appearance of horizontal floors connecting corallites. Shimer and Shrock, Index Fossils (1944), Pl. 42.

Syringopora: Corals in colonies of many individuals; tubes arranged in parallel masses; colonies hemispherical or honeycomb-like; tubes round or elliptical in outline; edges of cups not joined; tubes free, joined by distinct crossbars; diameter of tubes less than 1/8 inch; similar to Synaptophyllum but smaller; suggests a mass of spaghetti with crossbars joining the tubes at right angles; crossbars are numerous and never continue upward to form a new cup; they form a right angle, while budding individuals form an acute angle.
S. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 77.

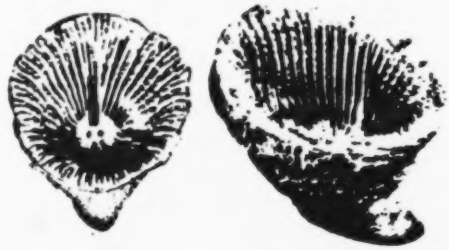


A13a - Zaphrentis corniculum

Zaphrentis: Simple, elongated corallum, surrounded completely by an epitheca; calyx deep; a single, well developed fossula marking abortion of cardinal septum; no columella; numerous well developed, serrate septa with carinae in typical species; tabulae imperfect or absent; septa prolonged generally to center of visceral chamber.
Z. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 27.

Zaphrentis: Solitary coral; horn-shaped; septa prominent, numerous; septa with wavy edges; septa straight to center; similar to Heliophyllum, but has straight septa, not twisted at center of cup.
Z. corniculum: LaRocque and Marple, Ohio Fossils (1955), p. 78.

A13b - Zaphrentis phrygia Rafinesque and Clifford



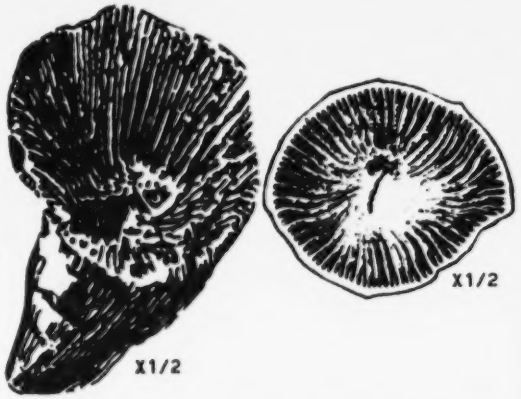
Zaphrentis: Simple, elongated corallum, surrounded completely by an epitheca; calyx deep; a single, well developed fossula marking abortion of cardinal septum; no columella; numerous well developed, serrate septa with carinae in typical species; tabulae imperfect or absent; septa prolonged generally to center of visceral chamber.
Z. phrygia: Corallum a curved cone with deep calyx, well marked fossula, carinated septa and without tabulae. Shimer and Shrock, Index Fossils (1944), Pl. 27.

Zaphrentis: Solitary coral; horn-shaped; septa prominent, numerous; septa with wavy edges; septa straight to center; similar to Heliophyllum, but has straight septa, not twisted at center of cup.
Z. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 78.

A14 - Heterophrentis prolifica (Billings)

Heterophrentis: Corallum zaphrentoid with large calyx bottomed by a single flat tabula which has a central, low rounded elevation; septa alternating in size, sharp-edged below calyx and often with inner edges twisted together.
H. prolifica: Conical and generally curved, expanding rapidly; septa meet at center of deep calyx, where frequently they are spirally twisted; fossula conspicious, deep, variable in position. Shimer and Shrock, Index Fossils (1944), Pl. 28.

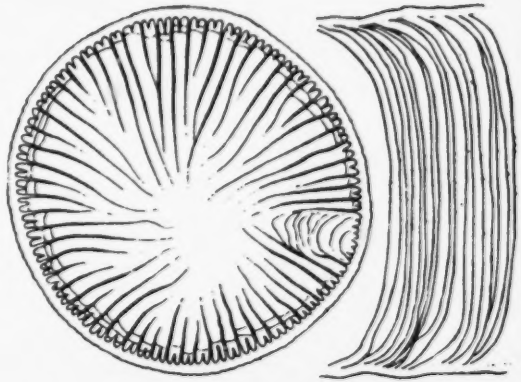
Heterophrentis: Solitary coral; horn-shaped coral; septa prominent, numerous; septa with straight edges; most of septa reach center of cup; septa less than 90 in number; resembles Zaphrentis, but septa have straight, not wavy edges.
H. prolifica: LaRocque and Marple, Ohio Fossils (1955), p. 78.



A15 - Siphonophrentis gigantea (Lesueur)

Siphonophrentis: Zaphrentoid, but having well developed tabulae extending across corallum and bending down marginally and on each side of cardinal septum, forming a series of invaginated funnels giving a siphono-fossula; no external vesicular zone.
S. gigantea: Generally large, becoming cylindrical in adult; length as much as 75 cm (2.5 ft.) with a diameter of 75 mm (3 inches); length of calyx shows a tabula, septa not reaching the center; fossula large and deep; epitheca strongly wrinkled; tabulae numerous, crowded. Shimer and Shrock, Index Fossils (1944), Pl. 28.

Siphonophrentis: Solitary coral; tube-shaped coral; much longer than wide; septa with straight edges; septa prominent, numerous; only half of septa reach center of cup; huge size and tube-like cup.
Z. gigantea: LaRocque and Marple, Ohio Fossils (1955), p. 78.



A16a - Coenites labiosa (Billings)

Coenites: Corallum composed of branching stems or flattened expansions with thick-walled, elongate, conical corallites opening obliquely to the surface, with dilated openings; mural pores and occasional tabulae present.
C. labiosa: Stems smaller and frequently branching, often reuniting; apertures subcircular, oblique, 2-3 mm in diameter, with prominent convex lip. Shimer and Shrock, Index Fossils (1944), Pl. 39.

Coenites: Cups are close together; some species have stick-like, branching colonies; others are leaf-like and flat.
C. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 59.

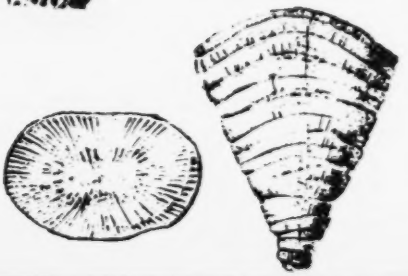
A16b - Coenites cryptodens (Billings)

Coenites: Corallum composed of branching stems or flattened expansions with thick-walled, elongate, conical corallites opening obliquely to the surface, with dilated openings; mural pores and occasional tabulae present.
C. cryptodens: Cylindrical bifurcating branches 5 to 10 mm diameter; corallites with oblique, dilated apertures 1 to 1.5 mm in diameter. Shimer and Shrock, Index Fossils Pl. 39

Coenites: Cups are close together; some species have stick-like, branching colonies; others are leaf-like and flat.
C. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 59.

A17 - Homalophyllum ungula (Rominger)

Homalophyllum: Corallum cornute, but asymmetrically flattened on convex side; calyx suboval to round; septa well developed, primary ones reaching to calyx center; tabulae and dissepiments present.
H. ungula: Corallum compressed dorsoventrally; long diameter of calyx about twice short diameter; septa 90 to 100, serrate. Shimer and Shrock (1944), Pl. 28.



A18a - Trachypora elegantula Billings

Trachypora: Corallum consisting of branching cylindrical stems, which are composed of prismatic corallites, the walls of which are so thickened by layers of stereoplasm that the apertures become round and greatly contracted, and are thus superficially far apart; rows of spines representing the septa are characteristic.
T. elegantula: Shimer and Shrock, Index Fossils (1944), Pl. 38.

Trachypora: Colonies of many individuals; tubes arranged in parallel masses; colonies branching; intervals between cups wider than cups themselves.
T. elegantula: LaRocque and Marple, Ohio Fossils (1955), p. 77.

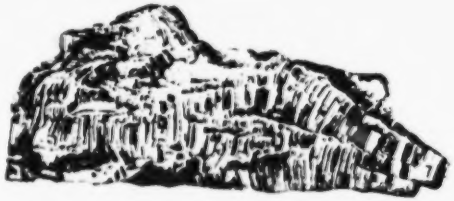
A18b - Trachypora ornata Rominger

Trachypora: Corallum consisting of branching cylindrical stems, which are composed of prismatic corallites, the walls of which are so thickened by layers of stereoplasm that the apertures become round and greatly contracted, and are thus superficially far apart; rows of spines representing the septa are characteristic.
T. ornata: Stems 10 to 20 mm in diameter; apertures circular or oval, generally slightly elevated, the interspaces wider than the apertures, which is 1.5 mm. Shimer and Shrock, Index Fossils (1944), Pl. 38.

Trachypora: Colonies of many individuals; tubes arrang ed in parallel masses; colonies branching; intervals between cups wider than cups themselves.
T. sp. LaRocque and Marple, Ohio Fossils (1955), p. 77.

A19 - Chaetetes milleporaceus Edwards and Haime

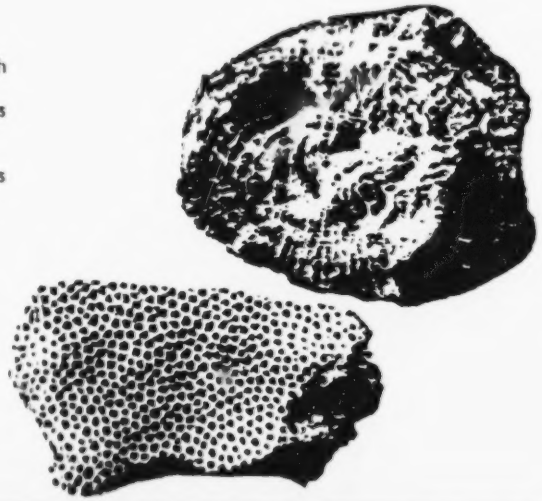
Chaetetes: Massive, composed of long, narrow, prismatic, thin-walled corallites; tabulae complete, remote or crowded; septa absent but pseudosepta common; probably no mural pores.
C. milleporaceus: Corallum massive, as much as 30 cm across; corallites with one diameter usually longer than the other; average diameter about 0.3 mm. Widespread throughout N.A. Shimer and Shrock, Index Fossils (1944), Pl. 35.



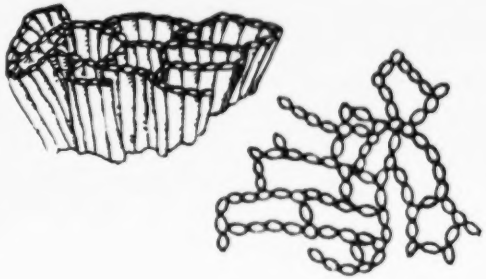
A20 - Thecia minor Rominger

Thecia: Generally massive coralla composed of prismatic, thick-walled corallites with funnel-shaped calices; base with wrinkled peritheca; tabulae and mural pores.
T. minor: Corallites 1 mm in diameter; septa may extend halfway to center; septa edges with two rows of granulose spinules. Shimer and Shrock (1944), Pl. 39

Thecia: Colonies of many individuals; tubes arranged in parallel masses; colonies hemispherical or elliptical in outline; tubes polygonal in outline; walls of cups thick.
T. minor: LaRocque and Marple, Ohio Fossils (1955), p. 58, 59.



A21 - Halysites centenularia (Linnaeus)



Halysites: Corallum of cylindrical or compressed corallites, joined into intersecting and anastomosing vertical laminae or a single layer of tubes, and united along the whole of their adjoining sides; corallites covered by a continuous peritheca on their free sides.
H. centenularia: Corallites oval in section, united by their narrow sides; outer surface of corallites with fine and occasionally coarse growth lines; meshes formed by corallites irregular and variable in size. Shimer and Shrock, Index Fossils (1944), Pl. 41.

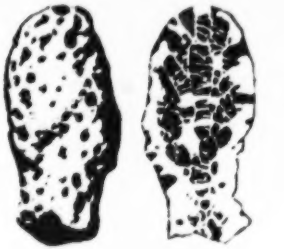
Halysites: Halysites is unique among the colonial forms. It has been well named "chain coral" for its tubes are arranged in rows in a chain-like network.
H. centenularia: LaRocque and Marple, Ohio Fossils (1955), p. 59.

A22 - Hadrophyllum orbignyi Edwards and Haime

Hadrophyllum: Characterized by thick, elevated corallum with calyx having four well developed fossulae, and the base has a conspicuous peduncle of attachment.
H. orbigni: Shimer and Shrock, Index Fossils (1944), Pl. 23.

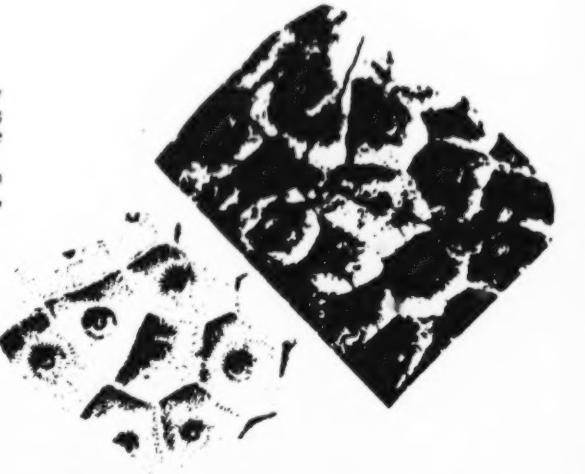
Hadrophyllum: The button coral cannot be mistaken for any other coral; there are distinct septa in the upper surface.
H. d'orbigni: LaRocque and Marple, Ohio Fossils (1955), p. 77.

A23 - Thamnopora madreporacea



Thamnopora: Corallum cylindrical or ramose; corallites disposed obliquely around central axis of finger-like branches; cells communicate by pores.
T. madreporacea: Shimer and Shrock, Index Fossils (1944), Pl. 38.

A24a - Arachnophyllum pentagonum (Goldfuss)

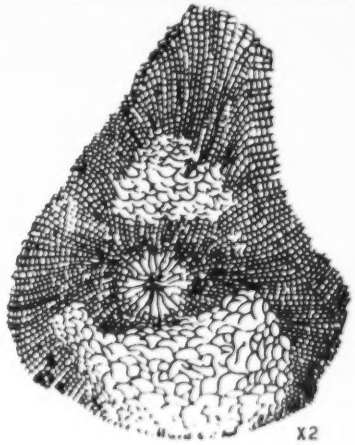


Arachnophyllum: Corallum low, spreading consisting of dissepiments and secondary septal tissue; very small intrathecal areas; corallites large, polygonal; calices shallow; outside septa appear as spinose crests on successive dissepimental floors; crests increase in number peripherally.
A. pentagonum: Calices shallow, 10 to 15 mm in diameter; center with a styliform columella; septa sharp at the pit, becoming rounded edges at margins. Shimer and Shrock, Index Fossils (1944), p. 34.

A24b - Arachnophyllum striatum (Orbigny)

Arachnophyllum: Corallum low, spreading consisting of dissepiments and secondary septal tissue; very small intrathecal areas; corallites large, polygonal; calices shallow; outside septa appear as spinose crests on successive dissepimental floors; crests increase in number peripherally.
A. striatum: Much larger than A. pentagonum, with calices as much as 40 mm in diameter; elevations around central pit pronounced; occurs with A. pentagonum. Shimer and Shrock, Index Fossils (1944), LaRocque and Marple, Ohio Fossils (1955), p. 59. Diagram from Treatise on Invertebrate Paleontology, F. Coelenterata (1956), p. F275.

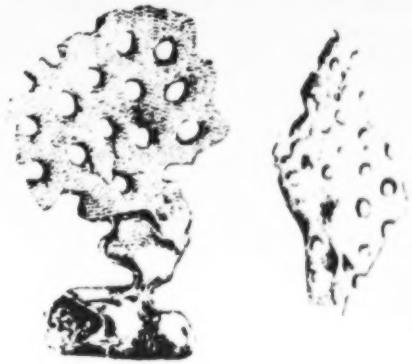
A.striatum. LaRocque and Marple, Ohio Fossils(1955),p.83.



BY1 - Coscinium striatum

Coscinium: Differs from Sulcoretepora in having branches inosculating (uniting) at short intervals, so as to produce broad fronds, perforated at regular intervals by elliptical or circular fenestrules.
C. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 102.

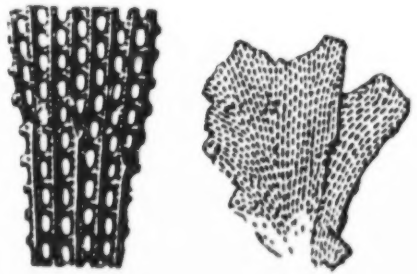
Coscinium: Colonies leaf-like; colony with regularly arranged holes; lacy appearance; widely spaced holes; has no crossbars; leaf-like colony is pieced by round holes.
C. striatum: LaRocque and Marple, Ohio Fossils (1955), p. 80.



BY2 - Fenestrellina sp.

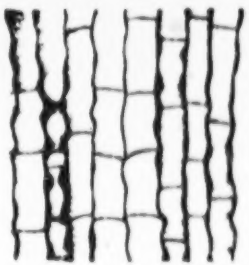
Fenestrellina: Fan or funnel-shaped, reticulated expansion of straight or flexous rigid branches; apertures united by noncelluliferous crossbars (dissepiments) at regular intervals; two rows of apertures on inside of branches, separated by a plain or tuberculated median keel.
F. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 99.

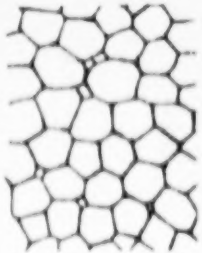
Fenestrellina: Colonies leaf-like; colony with regularly spaced holes; lacy appearance; holes as wide or wider than branches; branches anulated but not keeled; crossbars thin and narrow; colony made up of long rods joined by shorter crossbars.
F. sp.: LaRocque and Marple, Ohio Fossils (1955), pp. 62, 79.



BY3 - Monotrypa sp.

Monotrypa: Massive hemispherical or discoidal zooecia comparatively large and prismatic, with thin and often crinkled walls throughout; diaphragm remote; mesopores and acanthopores absent.
M. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 99.


X9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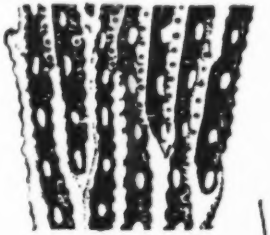
BY4 - Semicoscinium sp.

Semicoscinium: Funnel-shaped; all openings on outer side; wide, short dissepiments, the branches appearing to anastomose on nonporiferous face, whose fenestrules are subrhomboidal or rounded; apertures in two rows; median keel very high, expanded at summit.
S. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 99.

Semicoscinium: Colony leaf-like; colony with regularly arranged holes; lacy appearance; holes as wide or wider than branches; crossbars short and wide; colony made up of long rods joined by short crossbars; each branch has a sharp keel down middle; apertures are in 2 rows on each branch; similar to Fenestrellina, but has sharp keels on the branches.
S. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 61, 62, 79.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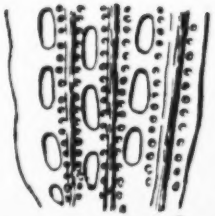
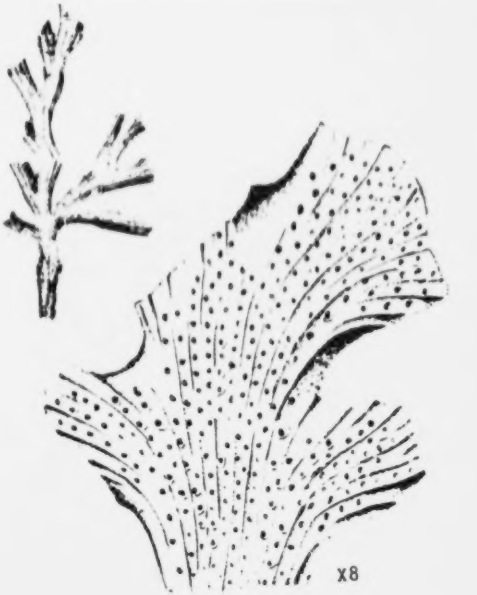

X18

BY5 - Sulcoretepora gilberti (Meek)

Sulcoretepora: Ramose, narrow, bifoliate branches, with lunaria and vesicles.
S. gilberti: Repeatedly branching rows of apertures and separating ridges, increasing rapidly by interpolation on the branches. Shimer and Shrock, Index Fossils (1944), Pl. 102.

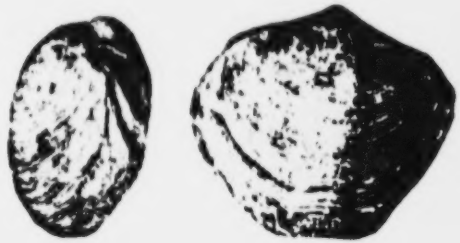
Sulcoretepora: Colonies twig-like, branching; branches flattened; branching, but not as many branches as Hederella, and branches are stouter.
S. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 79.



BR 1 - Athyris sp.

Athyris: Subequally biconvex; transversely elliptical, subcircular to elongate-ovate; exterior smooth or lamellose; ventral valve sulcate, dorsal valve with low fold; foramen circular; ventral interior with short stout dental plates; dorsal interior with apically perforate hinge plate; median ridge low; jugum complex.
A. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 127.

Athyris: Shell smooth or with concentric markings only; beak on margin of shell; with sinus and fold; height and width nearly equal.
A. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 81, 99.



BR 2a - Atrypa reticularis (Linnaeus)

Atrypa: Valves unequally convex, the ventral valve nearly flat or gently convex, the dorsal valve strongly convex; costellate to costate, lamellose to spinose, often frilled; ventral interior with large flabellate muscular field; dorsal interior with dorsally directed spiral cones, and widely divergent brachial supports.
A. reticularis: Shimer and Shrock, Index Fossils (1944), Pl. 121.

Atrypa: Shell with radiating and concentric markings; beaks on margin of shell; concentric markings weaker than radial markings; without sinus and fold; hinge line short (less than ½ width of shell); radiating markings coarse (less than 100 on one shell).
A. reticularis: LaRocque and Marple, Ohio Fossils (1955), p. 66, 82, 83.

BR 2b - Atrypa spinosa Hall

Atrypa: Valves unequally convex, the ventral valve nearly flat or gently convex, the dorsal valve strongly convex; costellate to costate, lamellose to spinose, often frilled; ventral interior with large flabellate muscular field; dorsal interior with dorsally directed spiral cones, and widely divergent brachial supports.
A. spinosa: Fairly large, subcircular to oval in outline; length and width about 38 mm; costate, strongest costae in middle, where there are eight in 13 mm; costae crossed by distant lamellae spines where lamellae and costa intersect. Shimer and Shrock, Index Fossils (1944), Pl. 121.

Atrypa: Shell with radiating and concentric markings; beaks on margin of shell; concentric markings weaker than radial markings; without sinus and fold; hinge line short (less than ½ width of shell); radiating markings coarse (less than 100 on one shell).
A. spinosa: LaRocque and Marple, Ohio Fossils (1955), p. 66, 82, 83.

BR 3 - Camarotoechia congregata (Conrad)

Camarotoechia: Generally triangular, costate, uniplicate, with shallow ventral valve and strongly convex dorsal valve; ventral interior with well developed dental plate; dorsal interior with divided hinge plates; no cardinal process, and segments of hinge plate attached to median septum by supporting plates making short, small cruralium covered with growth of inner hinge plates.
C. congregata: Shimer and Shrock, Index Fossils (1944), Pl. 118.

Camarotoechia: Shell with radiating and concentric markings; beaks on margin of shell; concentric markings weaker than radial markings; with sinus and fold; hinge line narrow (less than 1/3 of width); ribs of almost equal size throughout.
C. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 81, 99.

BR 4a - Chonetes scitulus Hall

Chonetes: Generally semielliptical to semicircular in outline, large or small, concavo-convex in profile; hinge straight; posterior margin of ventral valve provided with oblique, hollow spines; ventral interior large and flabellate muscle field and more or less defined median septum.
C. scitulus: Small, about 12 mm wide and 6 mm long; sides rounded to subulate; five or six spines on each side of beak. Shimer and Shrock, Index Fossils (1944), Pl. 134.

X1/2

Chonetes: Shells with radiating markings; beaks on margin of shell; concentric markings weaker than radial markings; without sinus and fold; hinge line wide (more than ½ width of shell); adult shell less than one inch wide; small size distinctive.
C. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 82, 83, 111.

BR 4b - Chonetes coronatus (Conrad)

Chonetes: Generally semielliptical to semicircular in outline, large or small, concavo-convex in profile; hinge straight; posterior margin of ventral valve provided with oblique, hollow spines; ventral interior large and flabellate muscle field and more or less defined median septum.
C. coronatus: Shimer and Shrock, Index Fossils (1944), Pl. 134.

Chonetes: Shells with radiating markings; beaks on margin of shell; concentric markings weaker than radial markings; without sinus and fold; hinge line wide (more than ½ width of shell); adult shell less than one inch wide; small size distinctive.
C. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 82, 83, 111.

BR 5 - Eunella sp.

Eunella: Small, compressed, ovate with strong dental plates in ventral valve; hinge plate short, attached to sides of valve by short plates; dorsal foramen large; plate uniting socket ridges short.
E. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 143.

BR6 - Craniops patina

Craniops: Small, oval to subcircular in outline, both valves depressed, conical; ornamentation consisting of concentric lines; both valves with central muscular areas.
C. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 109.

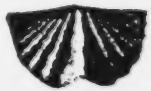
Craniops: Shell smooth or with concentric markings only; beak near center of shell; beaks near (less than 1/3 of shell) the margin.
C. patina: LaRocque and Marple, Ohio Fossils (1953), p. 81.

X1/2

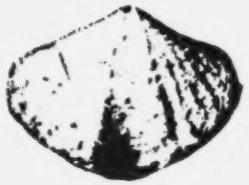
BR7 - Cyrtina hamiltonensis (Hall)

Cyrtina: Spiriferoid, small to middle sized, costate, with hemipyramidal ventral valve having a long, often deformed interarea; small slightly convex dorsal valve with prominent median fold; delthyrium covered with a convex pseudodeltidium? bearing a large foramen near apex; ventral interior with spondylium, the median septum appearing as a ridge in spondylium; dorsal interior with spire like Spirifer and having complete jugum.
C. hamiltonensis: Triangular-subpyramidal; hinge wide; cardinal extremities often acuminate; length and width nearly equal; length of interarea often equal to length of dorsal valve, fold broad and subangular; five to eight costae on flanks. Shimer and Shrock, Index Fossils (1944), Pl. 140.

Cyrtina: Shell with radiating and concentric markings; beaks on margin of shell; concentric markings weaker than radial markings; with sinus and fold; hinge line wide (more than 1/3 width); fold and sinus strong; ribs without fine radiating markings; one beak very large, with triangular area as high as half the width of shell or more under it.
C. hamiltonensis: LaRocque and Marple, Ohio Fossils (1953), p. 82.



BR8 - Elytha fimbriata (Conrad)



Elytha: Transversely elliptical in outline; boconvex, valves subequal in depth; costate, with low rounded costae crossed by distant lamellae bearing one row of long double-barreled spines; ventral valve with strong dental plates and median septum; dorsal valve with strong socket plates supported by short septa; no median septum.
E. fimbriata: Shimer and Shrock, Index Fossils (1944), Pl. 126.

Elytha: Shell with radiating and concentric markings; beaks on margin of shell; concentric markings weaker than radial markings; with sinus and fold; hinge line wide (more than 1/3 of inch); fold and sinus strong; ribs covered with fine radiating markings (really numerous spines).
E. fimbriata: LaRocque and Marple, Ohio Fossils (1953), p. 82.

BR9 - Leptaena rhomboidalis

Leptaena: Concavo-convex; valves strongly geniculated at front with posterior portion only slightly convex; costellate, valves often concentrically wrinkled; ventral valve with apical foramen, long palintrope; thickened margin to oval muscular area; dorsal valve with large bilobed carcinal process and thickened adductor field.
L. rhomboidalis: A name applied to most wrinkled members of genus throughout Devonian and of little stratigrahpic value. Shimer and Shrock, Index Fossils (1944), Pl. 132.

Leptaena: Shell with radiating and concentric markings; beaks on margin of shell; concentric markings stronger than radial markings; combination of strong concentric ridges and sharp downbending of shell.
L. rhomboidalis: LaRocque and Marple, Ohio Fossils (1953), p. 64, 81.

BR 10a - Megastrophia concava (Hall)

Megastrophia: Large; deeply concavo-convex; hinge completely denticulate; large costellae separate groups of smaller ones and all cancellated by radial concentric lines; ventral muscular field comparatively small; dorsal cardinal process bilobed, ponderous, adductor scars on elongate elevated platform.
M. concava: Large, alate, with hinge forming widest part; length four-fifths of hinge width; ventral valve very convex; costellae arranged in groups of fine ones separated by stronger ones, all cancellated by fine fila. Shimer and Shrock, Index Fossils (1944), Pl. 130, 131.

Megastrophia: Shell with radiating and concentric markings; beaks on margin of shell; concentric markings weaker than radial markings; without sinus and fold; hinge line wide (more than ½ width of shell); riblets of two sizes, one large alternating with many smaller ones.
M. sp.: LaRocque and Marple, Ohio Fossils (1955).

X1/2

BR 10b - Megastrophia hemisphaerica (Hall)

Megastrophia: Large; deeply concavo-convex; hinge completely denticulate; large costellate separate groups of smaller ones and all cancellated by raised concentric lines; ventral muscular field comparatively small; dorsal cardinal process bilobed, ponderous, adductor scars on elongate elevated platform.
M. hemisphaerica: Similar to M. concava but usually more convex with costellae nearly uniform. Shimer and Shrock, Index Fossils (1944), p. 339.

Megastrophia: Shell with radiating and concentric markings; beaks on margin of shell; concentric markings weaker than radial markings; without sinus and fold; hinge line wide (more than ½ inch width of shell); hinge line with fine tooth-like projections; tooth-like projections on entire hinge; riblets of two sizes, one large alternating with many smaller ones; like Stropheodonta but riblets arranged in characteristic pattern with two large ones and many smaller ones in between.
M. hemisphaerica: LaRocque and Marple, Ohio Fossils (1955), p. 82, 83.

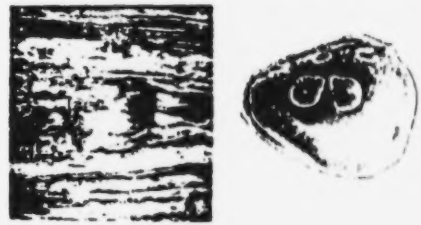
BR 11 - Nucleospira concinna (Hall)

Nucleospira: Small, subcircular, beak small; surface covered with short spines; ventral interior without dental plates; muscular field flabellate; median septum extending out from delthyrial cavity nearly to front margin; dorsal hinge plate recurved into ventral delthyrial cavity; jugum with long process extending almost to ventral valve.
N. concinna: Broadly elliptical in outline; valves deep. Shimer and Shrock (1944), Pl. 127.

Nucleospira: Shell smooth or with concentric ornamentation only; shell as wide as long, or wider than long; surface covered with short spines.
N. sp.: LaRocque and Marple (1955), p. 64.

BR 12 - Philhedra crenistriata (Hall)

Philhedra: Like Petrocrania in habit, profile, and outline but ornamented by elevated and marginally overlapping radial costellae; dorsal musculature the reverse of that of Petrocrania, the larger muscle scars occupying the center of the valve.
P. crenistriata: Shimer and Shrock, Index Fossils (1944), Pl. 109.



Philhedra: Shell smooth or with concentric rings; beaks near center of shell; distinctive radiating ornamentation; like Craniops but has the distinctive ornamentation.
P. crenistriata: LaRocque and Marple, Ohio Fossils (1955), p. 81.

BR 13 - Productella spinulicosta Hall

Productella: Concavo-convex, ventral valve provided with long spines; teeth on each side of delthyrium, and a short interarea; dorsal valve with erect lobate cardinal process, usually without spines.
P. spinulicosta: Semielliptical in outline with surface marked by strong concentric lines and several rows of interrupted spine bases; strongly wrinkled with four or five spines. Shimer and Shrock, Index Fossils (12944), Pl. 135.

BR 14 - Rhipidomella vanuxemi

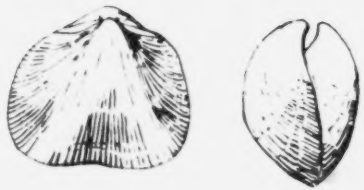
Rhipidomella: Generally circular in earlier forms, becoming subtriangular in later ones; compressed biconvex, finely costellate; hinge very narrow; ventral interior with large flabellate muscular field; dorsal valve with thick brachial processes and large bilobed cardinal process.
R. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 139.

Rhipidomella: Shell with radiating and concentric rings; beaks on margin of shell; concentric markings weaker than radial markings; without sinus and fold; hinge line short (less than ½ width of shell); radial markings very fine (more than 100 on one shell); valves are almost equal in thickness.
R. vanuxemi: LaRocque and Marple, Ohio Fossils (1955), p. 66, 100.

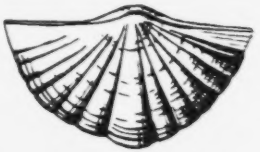
BR 15 - Schizophoria propinqua

Schizophoria: Interior of dorsal valve like Pionodema but ventral having divergent diductor scars separated by an elevated adductor ridge; ventral valve generally concave at front; dorsal valve strongly convex; finely costellate.
S. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 140.

Schizophoria: Shell with radiating and concentric markings; beaks on margin of shell; concentric markings than radial markings; with sinus and fold; hinge line wide (more than 1/3 of width); fold and sinus weak, practically absent in some specimens.
S. propinqua: LaRocque and Marple, Ohio Fossils (1955), p. 82.



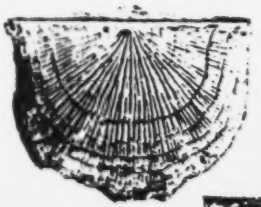
BR 16 - Spirifer duodenarious(?)



Spirifer: Medium-sized to large, transverse, generally with hinge forming widest part; completely costate; dental paltes stout; brachidium with many coils laterally directed; jugum incomplete; cardinal process a roughened area under beak.
S. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 124.

Spirifer: Shell with radiating and concentric markings; beaks on margin of shell; concentric markings weaker than radial markings; with sinus and fold; hinge line wide (more than 1/3 of width); fold and sinus strong; ribs without fine radiating markings; beaks with low triangular area under them; distinguished by its characteristic form; in side view each valve suggests a butterfly with pointed outspread wings.
S. duodenarious(?): LaRocque and Marple, Ohio Fossils (1955), p. 82, 83.

BR 17 - Stropheodonta demissa (Conrad)



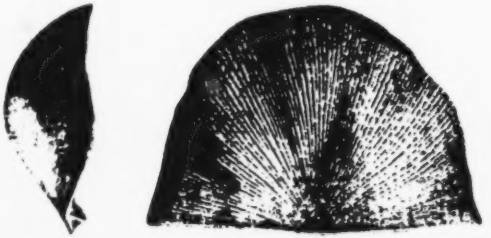
Stropheodonta: Concavo-convex in profile, costellate to costate; pseudodeltidium fused with interarea; apical foramen sealed; ventral muscular area broadly flabellate; dorsal valve with bilobed cardinal process; hinge completely denticulate.
S. demissa: Width 43 mm, length 37 mm, subrectangular in outline, umbonal region strongly costellate, flanks and margins more finely costellate. Shimer and Shrock, Index Fossils (1944), Pl. 131.

Stropheodonta: Shell with radiating and concentric markings; beaks on margin of shell; concentric markings weaker than radial markings; without sinus and fold; hinge line wide (more than ½ width of shell); adult shell more than one inch wide; hinge line with fine tooth-like projections; tooth-like projections on entire hinge; riblets more or less equal size.
S. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 82, 83.

BR 18 - Strophonella ampla (Hall)

Strophonella: Like Strophomena in profile, outline, and ornamentation but with a partly denticulate hinge.
S. ampla: Large; width up to 75 mm, length 50 mm; subrectangular in outline; dorsal valve strongly convex anteriorly; muscular area of ventral valve large, flabellate with thickened margins. Shimer and Shrock, Index Fossils (1944), Pl. 130.

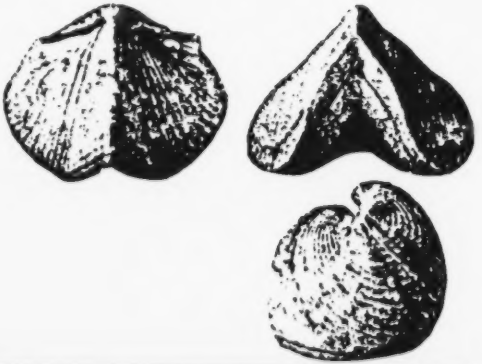
Strophonella: Shell wtih radiating and concentric markings; beaks on margin of shell; concentric markings weaker than radial markings; without sinus and fold; hinge line wide (more than ⅓ width of shell); adult shell more than one inch wide; hinge line with tooth-like projections; tooth-like projections on part of hinge only; more than 40 ribs on each valve; wide hinge line.
S. sp.: LaRocque and Marple, Ohio Fossils (1953), p. 63.



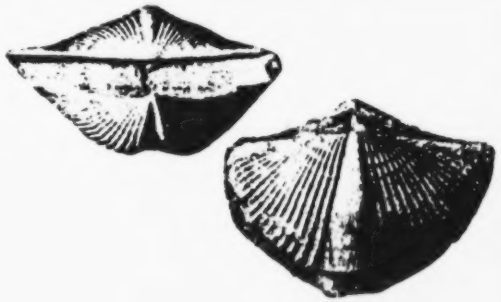
BR 19 - Paraspirifer acuminatus (Conrad)

Paraspirifer: Large, with low, broad costae bifurcating near front of valve; fold carinate and sulcus deep, noncostate; entire surface covered with concentric undulating lines of tiny spines.
P. acuminatus: Large, anterolateral extremities narrowly rounded; hinge narrower than greatest shell width. Shimer and Shrock, Index Fossils (1944), Pl. 123.

P. acuminatus: LaRocque and Marple, Ohio Fossils (1953), p. 83.



BR 20 - Brachyspirifer audaculus (Conrad)



Brachyspirifer: Generally wide, with long ventral palintrope; costate, costae smooth; fold and sulcus smooth; ventral interior with strong dental plates; dorsal interior with short medium septum.
B. audaculus: Large, anterolateral extremities narrowly rounded; hinge narrower than greatest shell width. Shimer and Shrock, Index Fossils (1944), Pl. 123.

B. audaculus: LaRocque and Marple, Ohio Fossils (1955), p. 83.

BR 21 - Brevispirifer gregarius (Clapp)

Brevispirifer: Exterior ornamentation and interior like Mucrospirifer but valves very narrow.
B. gregarius: About 19 mm wide, beak strongly incurved; fold and sulcus without median costa. Shimer and Shrock, Index Fossils (1944), Pl. 122.

B. gregarius: LaRocque and Marple, Ohio Fossils (1955), p. 83.

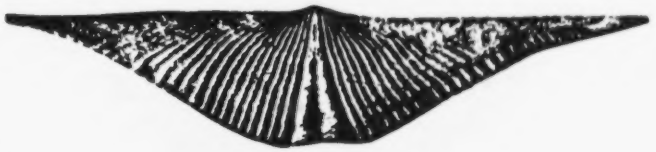
BR 22 - Eodevonaria arcuata (Hall)

Eodevonaria: Generally strongly convex chonetids with denticulate hinge and interior like Devonian Chonetes.
E. arcuata: Shimer and Shrock, Index Fossils (1944), Pl. 135.

BR23 - Mucrospirifer mucronatus (Conrad)

Mucrospirifer: Much wider than long, cardinal extremities often mucronate; fold and sulcus unmodified or with a single costa in the sulcus; surface costate, lamellose.
M. mucronatus: Very wide, attaining 100 mm in width, but less than 25 mm in length; lateral extremities mucronate; fold low, sulcus narrow, usually bearing one more or less distinct costa. Shimer and Shrock, Index Fossils (1955), Pl. 122.

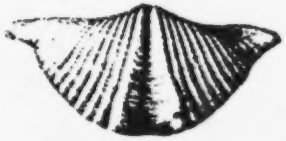
M. mucrospirifer: LaRocque and Marple, Ohio Fossils, p. 83.



BR24 - Mucrospirifer consobrinus (Orbigny)

Mucrospirifer: Much wider than long, cardinal extremities often mucronate; fold and sulcus unmodified or with a single costa in the sulcus; surface costate, lammellose.
M. consobrinus: Alate, strongly lamellose; fold narrow, flattened, with a deep longitudinal furrow; sulcus with a strong costa; flanks marked by 8-12 costae. Shimer and Shrock, Index Fossils (1944), Pl. 122.

M. consobrinus: LaRocque and Marple, Ohio Fossils (1955), p. 83.



G1 - Acanthonema newberryi (Meek)

Acanthonema: High spired shells with nearly straight outer lip; nucleus smooth, orthostrophic; base rounded, seemingly with minute umbilicus; ornamentation, one or more revolving ridges.
A. newberryi: Shimer and Shrock, Index Fossils (1944), Pl. 195.

Acanthonema: Height of shell greater than its length; aperture more than 1/3 of height; shell keeled; underside of shell rounded; small with keeled whorls and rounded base.
A. newberryi: LaRocque and Marple, Ohio Fossils (1955), p. 87.

G2 - Bembexia adjutor (Hall)

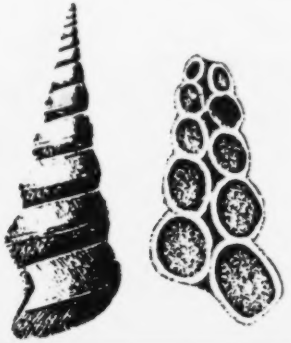
Bembexia: Turbinate shells of moderate size with subangular whorls and a concave selenizone lying between two sharp revolving carinae on periphery; umbilicus minute or wanting; usually one or two faint revolving ridges on upper whorl surface and sometimes another below selenizone; ornamentation, transverse growth lines sometimes fasciculating into nodes near upper suture and where they cross revolving ridges and sometimes revolving lirae.
B. adjutor: Shimer and Shrock, Index Fossils (1944), Pl. 184.

Bembexia: Height and width of shell almost equal; whorls keeled; strongest keel at middle of whorls; strong middle keel with finer ones above and below it.
B. adjutor: LaRocque and Marple, Ohio Fossils (1955), p. 87.

G3 - Coelocaulus macrospira (Hall)

Coelocaulus: Very high spired and many whorled shells with narrow umbilicus and deep, V-shaped sinus in outer lip which culminates subangularly; apex of sinus generates a broad, sometimes indistinct selenizone on whorl face.
C. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 186.

Coelocaulus: Height of shell greater than its width; aperture less than 1/3 of its height; whorls nearly flat; long thin shell; flatsided whorls.
C. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 67, 87.



G4 - Elasmonema bellatulum (Hall)

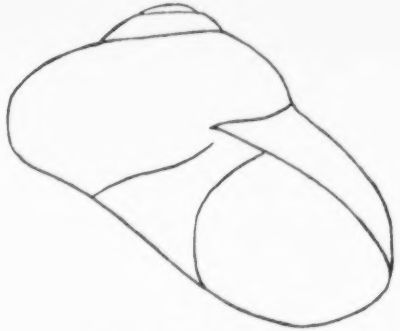
Elasmonema: Turbinate shells with shallow sutures; outer lip oblique and sometimes slightly sinuous; whorls usually flatly arched but sometimes shouldered; base rounded or flatly rounded with narrow umbilicus; ornamentation, transverse lirae.
E. bellatulum: Shimer and Shrock, Index Fossils (1944), Pl. 192.

Elasmonema: Height and width of shell almost equal; whorls not keeled; aperture less than ½ the height of shell.
E. bellatulum: LaRocque and Marple, Ohio Fossils (1955), p. 87.

G5 - Isonema humile Meek and Worthen

Isonema: Somewhat lenticular, turbinate shells with deeply embracing whorls and a sharply rounded periphery; outer lip straight and oblique; base flatly arched, with thickened parietal inductura covering umbilical region; ornamentation, fine, often fasciculated transverse lirae.
I. humile: Shimer and Shrock, Index Fossils (1944), Pl. 193.

Isonema: Height of shell less than its width; whorls not keeled; umbilicus open; base is flat and sunken.
I. humile: LaRocque and Marple, Ohio Fossils (1955), p. 88.



G6 - Loxonema hamiltoniae Hall

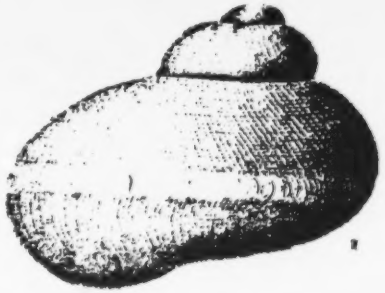
Loxonema: High spired shells with U-shaped sinus in outer lip; nucleus smooth, orthostropic; base without umbilicus; ornamentation, growth lines or transverse costae extending into base.
L. hamiltoniae: Shimer and Shrock, Index Fossils (1944), Pl. 186.

Loxonema: Height of shell greater than its width; aperture less than 1/3 of the height; whorls strongly rounded, giving the spire the appearance of a string of beads.
L. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 87.

G7 - Mourlonia lucina (Hall)

Mourlonia: Turbinate shells with shallow sinus in the rather oblique outer lip culminating at rounded periphery in a moderately deep slit which generates selenizone; whorls rounded, embracing almost to selenizone; base rounded, with or without a narrow umbilicus; ornamentation, rather strong transverse lirae, in some species crossed by fine revolving lirae.
M. lucina: Shimer and Shrock, Index Fossils (1944), Pl. 184.

Mourlonia: Height of shell less than its width; whorls keeled; lip touching previous whorl; shell tightly coiled; spire elevated above level of whorl; base of shell rounded.
M. lucina: LaRocque and Marple, Ohio Fossils (1955), p. 88.



G8 - Murchisonia desiderata Hall

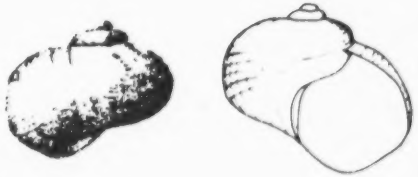
Murchisonia: High spired, many whorled shells with a rather deep sinus in outer lip culminating at about midwhorl in a short slit which generates selizone; whorls rounded to subangular; base rounded, without umbilicus, often set off by an obscure revolving angulation; ornamentation, commonly growth lines alone but in some species elaborated by various nodes and revolving features.
M. desiderata: Shimer and Shrock, Index Fossils (1944), Pl. 186.

Murchisinia: Height of shell greater than its width; aperture less than 1/3 of height; whorls keeled or angled; like Coelocaulus and Loxonema, but whorls are keeled.
M. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 87.

G9 - Naticonema lineata (Conrad)

Naticonema: Naticiform shells similar to Platyceras, but with columellar lip flattened and excavated; ornamentation, fine revolving lirae and growth lines.
N. lineata: Shimer and Shrock, Index Fossils (1944), Pl. 194.

Naticonema: Height of shell less than its width; whorls not keeled; umbilicus closed; like Isonema but has rounded base and different ornamentation.
N. lineata: LaRocque and Marple, Ohio Fossils (1955), p. 89.



G10 - Naticopsis sp.

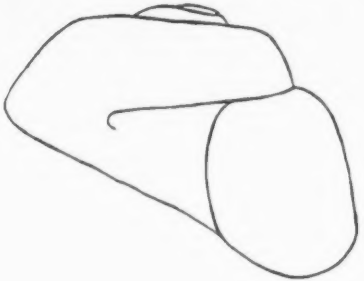
Naticopsis: Neritiform to naticiform shells with large final whorl and nearly straight but oblique outer lip; base without umbilicus; parietal inductura thickened and in most species extended and flattened in plane of aperture, sometimes striated; ornamentation, growth lines alone, often fasciculate just below upper structure; operculum calcareous, nonspiral.
N. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 194.

Naticopsis: Height and width of shell almost equal; whorls not keeled; aperture more than ½ the height of the shell; spire very low; growth lines fine; aperture is bigger; growth lines are very fine (if preserved); shell is very thick.

N. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 87.

G11 - Palaeotrochus kearneyi

Palaeotrochus: None. Shimer and Shrock (1944).

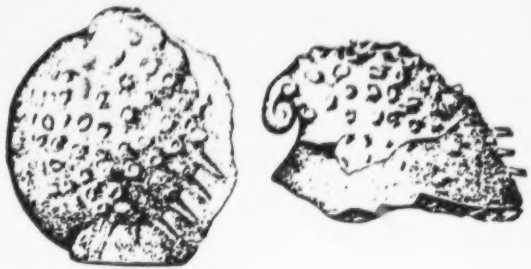


Paleotrochus: Height of shell greater than its width (but not much); aperture more than 1/3 of height; shell keeled; underside of shell almost flat; top-shaped with strong basal keel; coarse growth lines.
P. kearneyi: LaRocque and Marple, Ohio Fossils (1955), p. 87.

G12 - Platyceras dumosum (Conrad)

Platyceras: Naticiform to horn-shaped shells characterized by irregularities of growth reflecting irregularities of substratum to which shell was fixed during much of its life; shell is thin and apertural margin is thin without fixed physiological modifications; shell resists solution fairly well and hence is often well preserved; ornamentation includes fine revolving and transverse elements and in some species coarse hollow spines.
P. dumosum: Shimer and Shrock, Index Fossils (1944), Pl. 193.

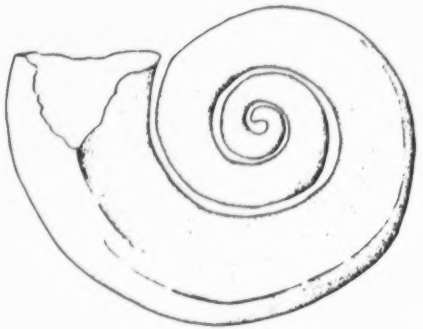
Platyceras: Height of shell less than its width; whorls keeled; distinctive shape, due mainly to rapid increase in size of whorls; external ornamentation varies from nearly smooth shells to forms with knobs and spines which may be half the diameter of the shell or more; lip is detached from last whorl in most specimens.
P. dumosum: LaRocque and Marple, Ohio Fossils (1955), p. 88.



G13 - Pleuronotus decewi (Billings)

Pleuronotus: Discoidal shell with depressed spire and wide umbilicus; whorls subangularly shouldered; a deep V-shaped sinus in outer lip culminating at crest of angulation in a short notch-like which generates selenizone; earlier whorls partitioned; ornamentation, growth lines.
P. decewi: Shimer and Shrock, Index Fossils (1944), Pl. 189.

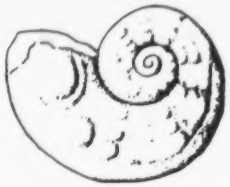
Pleuronotus: Height of shell less than its width; whorls keeled; lip touching previous keel; shell tightly coiled; spire sunken below level of whorls squarish in cross section, even internal molds; surface has no bead-like ornamentation.
P. decewi: LaRocque and Marple, Ohio Fossils (1955), p. 88.



G14 - Porcellia sciota

Porcellia: None. Shimer and Shrock, Index Fossils (1944).

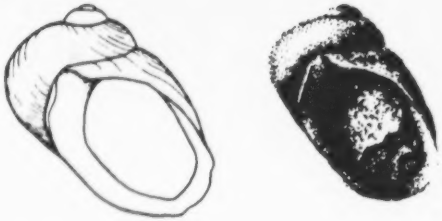
Porcellia: Height of shell less than its width; whorls keeled; lip touching previous keel; shell tightly coiled; spire sunken below level of whorls; keel small, numerous, regular, beaded; upper ones and lower ones scalloped; row of wart-like bumps with fine, crowded axial and spiral ridges, which give appearance of beadwork.
P. sciota: LaRocque and Marple, Ohio Fossils (1955), p. 88.



G15 - Ptychospirina varians (Hall)

Ptychospirina: Naticiform to turbinate shells very similar to Platyceras, but with apertural margins complete and unbroken and apertures obliquely elongated; occasional irregularities of growth attest a habit of fixation; ornamentation, usually transverse lirae or growth lines.
P. variens: Shimer and Shrock, Index Fossils (1944), Pl. 194.

Ptychospirina: Height and width of shell almost equal; whorls not keeled; aperture more than ½ height of shell; spire high; growth lines coarse.
P. varians: LaRocque and Marple, Ohio Fossils (1955), p. 87.

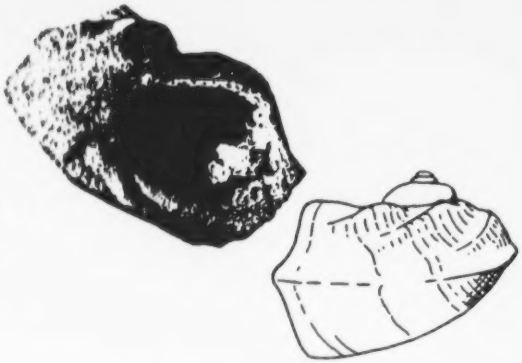


G16 - Soleniscus hebe

Soleniscus: Fusiform shells with moderately high spire and siphonal channel at base of columella; inductura seemingly confined to lower part of inner lip and bearing two folds which are visible only when aperture is broken; lower (siphonal) fold obscure and near base while upper fold close above it is more strongly developed; base tapering without umbilicus; ornamentation, fine growth lines.
S. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 196.

Soleniscus: Height of shell greater than its width; aperture more than 1/3 of its height; shell not keeled; spindle-shaped; aperture is very narrow at top.
S. hebe: LaRocque and Marple, Ohio Fossils (1955), p. 87.

G17 - Turbonopsis shumardi (Hall)



Turbonopsis: Large turbinate shells with oblique, convex outer lip and conspicuous rounded carina around periphery; base rounded, without an umbilicus; inner lip thickened and channeled; ornamentation, growth lines and prominent, oblique knoblike ridges crossing shoulder angle.
T. shumardi: Shimer and Shrock, Index Fossils (1944), Pl. 194.

Turbonopsis: Height of shell less than its width; whorls keeled; lip touching whorl; shell tightly coiled; spire elevated above level of whorl; resembles Palaeotrochus, but base is not flattened, keel is higher on whorl, and upper part of whorl has a row of wrinkle-like bumps.
T. shumardi: LaRocque and Marple, Ohio Fossils (1955), p. 88.

T1 - Tentaculites scalariformis Hall

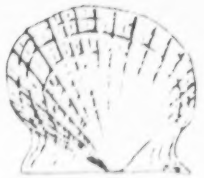
Tentaculites: Shell straight of slightly curved; elongate-conical terminating posteriorly either acutely or in a bulb; cross section circular; surface with strong transverse rings closely arranged near apex and more distant and stronger near mouth; fine transverse and rarely longitudinal striae present; apical portion often filled with calcareous material or transversely septate.
T. scalariformis: Differs from T. bellus in the more obtuse annulations of distal portion, with narrower interspaces, and in more rapidly narrowing apical portion. Shimer and Shrock, Index Fossils (1944), Pl. 214.

Tentaculites: Small, conical; distinctive rings on shell; looks like a small wood screw, but markings are not spiral but are circular.
T. scalariformis: LaRocque and Marple, Ohio Fossils (1955), p. 89.

X2

P1 - Aviculopecten cleon Hall

Aviculopecten: Pectiniform, inequilateral, inequivalve, with right valve usually less convex than left; hinge line straight with both anterior and posterior ears; surface usually radially sculptured; a single oblique, subcentral resilifer beneath each beak; teeth absent; pallial line simple.
A. cleon: Shimer and Shrock, Index Fossils (1944), Pl. 159.

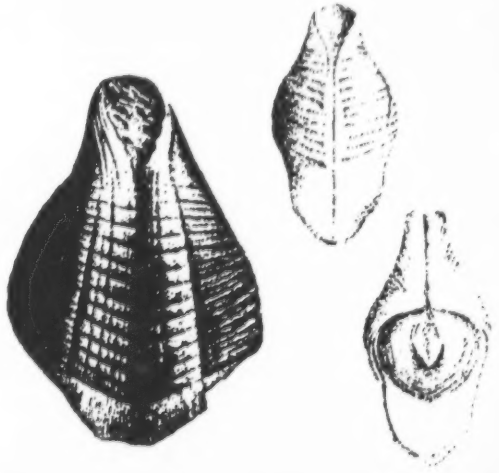


Aviculopectin: Height and length of shell approximately equal; length less than 1.5 times the height; surface with concentric and radiating ornamentation; shell with two well developed wings; ribs numerous and subequal; shell not oblique; closest thing to scallop.
A. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 84, 114.

P2 - Conocardium cuneus (Conrad)

Conocardium: Very inequilateral; anterior side short, truncated and flattened laterally but produced along hinge line into beak-like appendage; this appendage, however, is usually broken away, leaving a round hole in the flat anterior view; posterior side extended and gaping in lateral view; beaks prominent and strongly curved; hinge line long; umbonal ridge prominent, outlining the flat anterior side; surface marked by concentric striae and usually by radiating plications which crenulate the basal margin; there is often an expansion of the shell extending anteriorly from the entire periphery of the umbonal ridge.
C. cuneus: Shimer and Shrock, Index Fossils (1944), Pl. 150.

Conocardium: Length of shell 1.5 times or more than 1.5 times the height; strong ribs on entire surface of shell; surface with strong radiating ribs; hood is often preserved in specimens.
C. cuneus: LaRocque and Marple (1955), p. 84.



P3 - Modiomorpha concentrica (Conrad)

Modiomorpha: Subovate, widest posteriorly, crossed obliquely from beak to base by a depression constricting the basal margin; beaks small compressed; surface bearing rugose or undulating concentric striae; hinge with strong wedge-shaped tooth in left valve and corresponding cavity in right; no lateral teeth present; ligament external, attached to thickened shell margin, which is often longitudinally grooved for its reception; pallial line simple.
M. concentrica: Shimer and Shrock, Index Fossils (1955), Pl. 164.

Modiomorpha: Length of shell 1.5 times or more than 1.5 times the height; surface with concentric ornamentation only; similar to present day river clams; shell swollen at end away from beak; lacks internal ridge.
M. concentrica: LaRocque and Marple, Ohio Fossils (1955), p. 85.

P4 - Paracyclas elliptica Hall

Paracyclas: Suboricular, thin-shelled, with small and low beaks and short hinge line; posterior portion near beaks more or less defined by an oblique furrow, sometimes with posterior hinge extremity almost winged; surface concentrically striated, striae often ridgelike; lunule absent; ligament set in deep groove; pallial line simple.
P. elliptica: Shimer and Shrock, Index Fossils (1944), Pl. 168.

Paracyclas: Height and length of shell approximately equal; length less than 1.5 times the height; surface smooth or with concentric ornamentation only; round clam; almost round in outline; has sharp, closely spaced concentric ridges.
P. elliptica: LaRocque and Marple, Ohio Fossils (1955), p. 85.

P5 - Actinoptera boydi (Conrad)

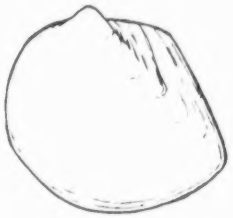
Actinoptera: Inequivalve, oblique, thin; anterior muscle scar faint or absent; pallial line simple; differs from Pterinea in lacking a broad striated ligament area, and strong cardinal and lateral teeth.
A. boydi: Ear and wing less defined and body of shell less oblique than in A. decussata; has numerous sharp radii. Shimer and Shrock, Index Fossils (1944), Pl. 152.

P6 - Sanguinolites sanduskiensis

Sanguinolites: "Sphenotus" in Shimer and Shrock, Index Fossils (1944).

Sanguinolites: Length of shell 1.5 times or more than 1.5 times the height; surface with concentric ornamentation only; shell not swollen at one end; has closely spaced concentric ridges.
S. sanduskiensis: LaRocque and Marple, Ohio Fossils (1955), p. 85.

P7 - Schizodus appressus



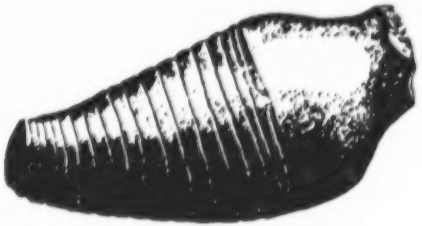
Schizodus: Shell thin, trigonal, often tending toward quadrate, longest posteriorly; right valve with two smooth cardinal teeth, left with three; surface smooth or concentrically striated; two muscle impressions, anterior one with small radial buttress; pallial line simple.
S. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 159.

Schizodus: Height and length of shell approximately equal; surface smooth or with concentric ornamentation only; shell elongate in outline; shell without internal ridge; squarish outline; evenly convex shell; thicker in region of beak.
S. appressus: LaRocque and Marple, Ohio Fossils (1955), p. 85.

C1 - Acleistoceras hyatti Whitfield

Acleistoceras: Conch nearly straight, ventral outline more convex than dorsal apertural outline distinctly triangular; siphuncular segments nummuloidal, with strongly convex lateral outline but strongly flattened at top and bottom in direction parallel to septa and overlapping in stairlike manner; siphuncle endogastric. Nautiloid.
A. hyatti. Shimer and Shrock, Index Fossils (1944), Pl. 229.

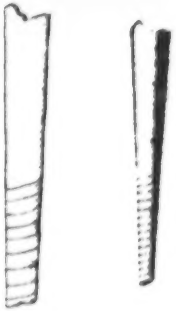
Acleistoceras: Curved shell; widest about middle of living chamber; narrower at aperture.
A. sp.: LaRocque and Marple, Ohio Fossils (1953), p. 90.



C2 - Bactrites arkonensis Whiteaves

Bactrites: Conch long, straight, slender, circular elliptical in section; aperture with hyponomic sinus on siphonal side of conch; at maturity each suture forms a small, prominent, V-shaped ventral lobe; lateral and dorsal portions of sutures essentially straight or with shallow lateral lobes and dorsal saddle; septa directly transverse to conch axis, or slightly oblique thereto; siphuncle ventral and marginal. Ammonoid.
B. arkonensis: Shimer and Shrock, Index Fossils (1944), Pl. 231.

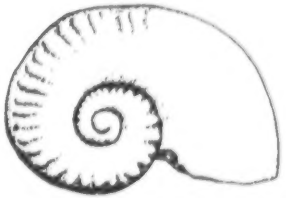
Bactrites: Shell smooth; shell small, about ½ inch in diameter; straight; septa have wavy edges; one of earliest ammonoids.
B. arkonensis: LaRocque and Marple, Ohio Fossils (1953), p. 90.



C3 - Centroceras ohioense

Centroceras: Cyrtoceracones and gyroceracones similar to Halloceras, but larger and with coarser, crenulated bands often expanded into spoutlike, spinous processes, which may form coarse, longitudinal ridges; siphuncle ventral, less nummuloidal, and larger than Halloceras. Nautiloid.
C. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 223.

Centroceras: Shell coiled; whorls touching; umbilicus wide; distinguished by a row of bumps (tubercules) on the outer edge of whorl.
C. ohioense: LaRocque and Marple, Ohio Fossils (1953), p. 90.



C4 - Gigantoceras inelegans (Meek)

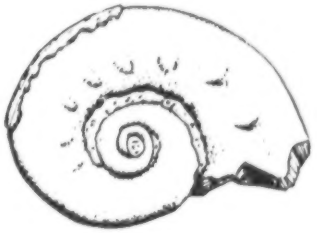
Gigantoceras: Gyroseracones with stout volutions of compressed elliptical form, with long living chamber; siphuncle large, nummuloidal, empty, near center; includes largest known nautiloid shells. Nautiloid.
G. inelegans: Shimer and Shrock, Index Fossils (1944), Pl. 228.

Gigantoceras: Shell coiled; whorls touching; umbilicus wide; entire whorl smooth.
G. inelegans: LaRocque and Marple, Ohio Fossils (1955), p. 91.

C5 - Nassauoceras seminodosus

Nassauoceras: None. Shimer and Shrock, Index Fossils (1944).

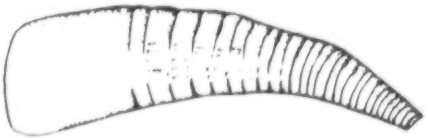
Nassauoceras: Shell coiled; whorls touching; umbilicus is wide; outer edge of whorl smooth; row of tubercules on top of whorls.
N. seminodosus: LaRocque and Marple, Ohio Fossils (1955), p. 90.



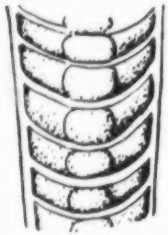
C6 - Nephriticerina metula

Nephriticerina. None. Shimer and Shrock, Index Fossils (1944).

Nephriticerina: Shell of few whorls; whorls not touching; whorls expand very rapidly.
N. metula: LaRocque and Marple, Ohio Fossils (1955), p. 91.



C7a - Ormoceras winchelli



Ormoceras: Septal necks evenly curved, with siphonal deposits in apical fourth or less of phragmocone.
O. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 227.

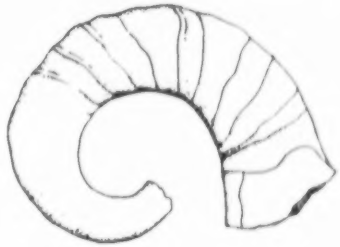
Ormoceras: Shell straight; septal edges straight; a nautiloid, and much larger than Bactrites; shell more than ½ inch in diameter.
O. winchelli: LaRocque and Marple, Ohio Fossils (1955), p. 90.

C7b - Ormoceras allumettense (Billings)

Ormoceras: Similar to actinoceroid orthocone in which siphuncles usually are large, compared with conch diameter; siphuncular interior more or less filled with calcareous deposits; septal necks evenly curved, with siphonal deposits in phragmocone.
O. allumettense: Shimer and Shrock, Index Fossils (1944), Pl. 227.

Ormoceras: Shell straight; septal edges straight; a nautiloid, and much larger than Bactrites; shell more than ½ inch in diameter.
O. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 90.

C8 - Ryticeras cyclops



Ryticeras: Cyrtoceracones and gyroceracones similar to Halloceras, but larger and with coarser, crenulated bands often expanded into spoutlike, spinous processes, which may form coarse, longitudinal ridges; siphuncle ventral, less nummuloidal, and larger than Halloceras.
R. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 222.

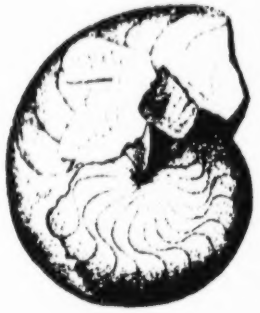
Ryticeras: Loosely coiled shell; whorls do not touch; whorls expanding slowly; some have frill-like expansions of shell; when shell cut through frills look like spines.
R. cyclops: LaRocque and Marple, Ohio Fossils (1955), p. 91.

C9 - Spyroceras thoas (Hall)

Spyroceras: Conchs crossed transversely by strong, sharply defined, and rather distant annulations; vertical striae very fine, closely crowded; no corresponding fine transverse striae; lineate group with vertical markings of equal strength; bilineate with numerous fine vertical striae crossed by about same number of fine transverse striae; scalariform group has relatively distant vertical ribs crossed by distinct and relatively large transverse raised lines; structure of siphuncle not well known.
S. thoas: Shimer and Shrock, Index Fossils (1944), Pl. 221.

Spyroceras: Straight nautiloids; series of ring-like expansions and contractions make shell distinctive.
S. thoas: LaRocque and Marple, Ohio Fossils (1955), p. 90.

C10 - Tornoceras uniangulare (Conrad)



Tornoceras: Conch ammonitoconic, subdiscoidal or sublenticular; whorls compressed; flattened laterally, impressed dorsally, and rounded, subangular or flattened ventrally; umbilicus closed, or open and funnel-shaped; growth lines sinuous, forming sinuses on ventral and lateral sides of conch; at maturity each external suture forms a small V-shaped ventral lobe, and on each side of it a ventrolateral saddle.
T. uniangulare: Shimer and Shrock, Index Fossils (1944), Pl. 231.

Tornoceras: Shell coiled; whorls touching; umbilicus very narrow; coiled ammonoid with narrow almost closed umbilicus; other coiled cephalopods are nautiloids.
T. uniangulare: LaRocque and Marple, Ohio Fossils (1955), p. 90.

C11 - Tylorthoceras ohioense (Whitfield)

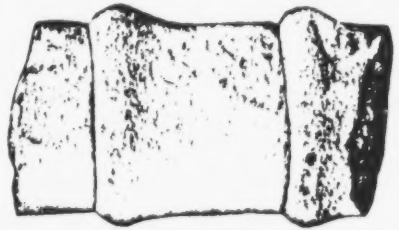
Tylorthoceras: Orthoceroid, but with a series of elongate tubercules on one side, which appear to represent an interrupted series of elongate openings in the living chamber, progressively closed by shelly deposits.
T. ohioense: Shimer and Shrock, Index Fossils (1944), Pl. 219.

Tylorthoceras: Straight and smooth except for a row of tubercules on one side of shell.
T. ohioense: LaRocque and Marple, Ohio Fossils (1955), p. 90.

C12 - Huronia bigsbyi Stokes

Huronia: Conch with large siphuncles, segments of which tend to take short, inverted pestles, the annulations forming upper third or two-fifths of segment lengths; typically, lateral outlines of lower and middle parts tend to be about vertical, but in some species these segments contract conspiciously toward their lower ends, so that their outlines become oblique. Nautiloid.
H. bigsbyi: Shimer and Shrock, Index Fossils (1944), Pl. 227.

Huronia: None. LaRocque and Marple, Ohio Fossils (1955).



X1/2

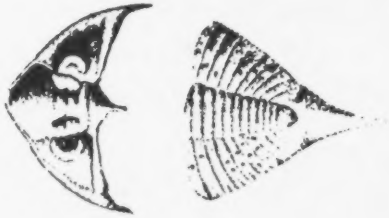
C13 - Orygoceras cornuoryx (Whitfield)

Orygoceras: Orthocones with subcircular or oval section; annulations only internal; siphuncle eccentric and tubular. Nautiloid.
O. cornuoryx: Shimer and Shrock, Index Fossils (1944), Pl. 217.

TR 1 - Anchiopsis anchiops (Green)

Anchiopsis: Like Synphoria, with cephalon short and wide, glabellar lobes confluent and highly elevated distally, second and third pairs of lateral furrows represented by rounded pits; pygidium triangular, with short, triangular, upturned spines, and with about 15 axial annulations.
A. anchiops: Shimer and Shrock, Index Fossils (1944), Pl. 274.

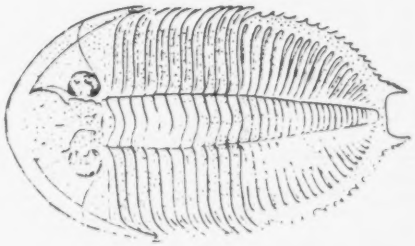
Anchiopsis: Cheek spines; a central neck spine; terminal tail spine; some specimens quite large.
A. anchiops: LaRocque and Marple, Ohio Fossils (1955), p. 92.



TR 2 - Coronura aspectans (Conrad)

Coronura: Like Synphoria, except that pygidium has numerous lateral spines and a crescentic, spinose terminus.
C. aspectans: Shimer and Shrock, Index Fossils (1944), Pl. 274.

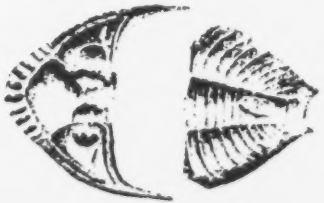
Coronura: Grows very large; has cheek spines, but no central neck spine; front margin of head not fluted; central part of head is lobed and bulges out in front; tail has many spines, two on each end of most segments, none terminal.
C. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 92.



TR 3 - Odontocephalus sp.

Odontocephalus: Like Synphoria, except that cephalic border has distally coalesced spines in front of glabella, and pygidium has a crescentic terminus of two spines.
O. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 273.

Odontocephalus: Has cheek spines but no central neck spine; two tail spines are on sides, not terminal; central part of head is lobed, and bulges out in front; flutings on head distinctive.
O. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 92.



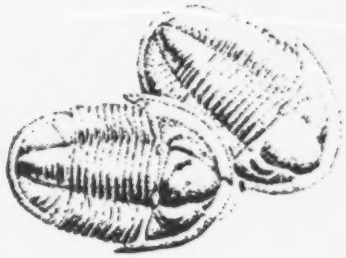
TR4 - Phacops cristata Hall

Phacops: Glabella more or less swollen; subcranial furrow continuous; genal angles generally rounded; marginal rim narrow; cephalic doublure slightly convex.
P. cristata: Shimer and Shrock, Index Fossils (1944), Pl. 274.

Phacops: Neither cheek nor tail spines; central part of head bulges out in front; tail lacks a border; tail segments without central tubercule.
P. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 92.

TR5 - Proetus rowi (Green)

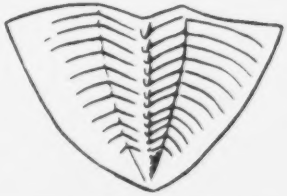
Proetus: Cephalon somewhat larger than pygidium; glabella convex, extending nearly to anterior cephalic margin, and without deep lateral furrows; eyes prominent, smooth, and close to glabella; thoracic segments usually 10, convex, with pleura grooved; pygidium semicircular with flat margin, its axis very convex, and not extending to posterior border, and usually with less than 14 annulations; entire test surface granulose.
P. rowi: Shimer and Shrock, Index Fossils (1944), Pl. 274.



Proetus: Cheek spines, but no tail spines; central part of head bulges out in back; tail has a distinct border.
P. rowii: LaRocque and Marple, Ohio Fossils (1955), p. 92.

TR6 - Trypaulites calypso

Trypaulites: None. Shimer and Shrock (1944).

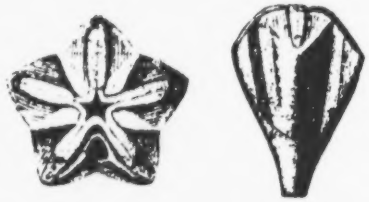


Trypaulites: Cheek spines, but no tail spines; central part of head bulges out in front, but is not lobed; no central neck spine on head; tail without border or spines; has a tubercule on central part of each segment.
T. calypso: LaRocque and Marple, Ohio Fossils (1955), p. 92.

BL1 - Codaster pyramidatus Shumard

Codaster: Calyx conical, acutely pointed below and truncated above, periphery near summit; transverse section pentagonal; basals and radials long, subequal; radials only slightly notched by sinuses.
C. pyramidatus: Summit convexly rounded; radials bear flattened marginal bands; "Amb" project above sinus margins; seven to eight hydrospire slits, one partly concealed. Shimer and Shrock, Index Fossils (1944), Pl. 50.

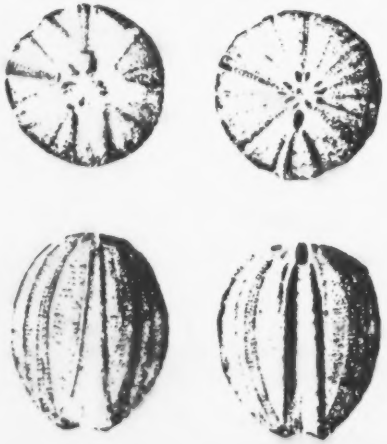
Codaster: Cup with decidedly pointed ends; five indentations in top half of cup.
C. pyramidatus: LaRocque and Marple, Ohio Fossils (1953), p. 93.



BL2 - Nucleocrinus verneuili (Troost)

Nucleocrinus: Calyx olive-shaped, smaller below; basals small, commonly hidden in a basal concavity; radials small, limbs short, lips prominent; deltoids forming more than two-thirds of calyx.
N. verneuili: Radials very short, with scarcely any subdivision into bodies and limbs. Shimer and Shrock, Index Fossils (1944), Pl. 51.

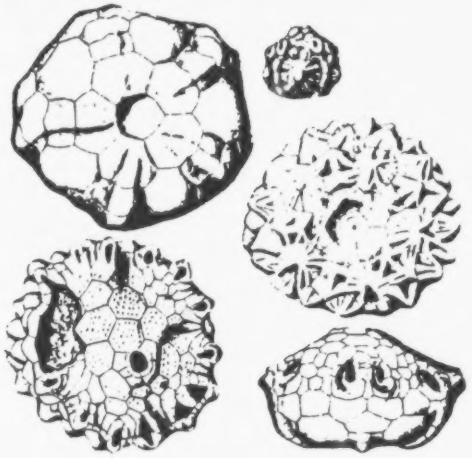
Nucleocrinus: Melon-shaped and has rounded ends; large, as blastoids go, and lacks strong indentations of Codaster.
N. verneuili: LaRocque and Marple, Ohio Fossils (1953), p. 93.



CR1 - Dolatocrinus sp.

Dolatocrinus: Calyx depressed, subglobose; BB small, commonly fused; 1 BrBr large, LBr exceptionally large; respiratory pores on tegmen; arms biserial, branching.
D. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 74.

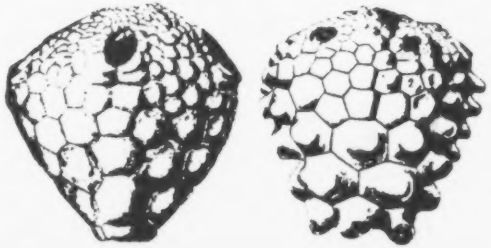
Dolatocrinus: Bowl-shaped cup, wider than high; plates are convex, and each is ornamented with radiating ridges.
D. sp.: LaRocque and Marple, Ohio Fossils (1955), p. 94.



CR2 - Melocrinites onondaga

Melocrinites: BB four; PBRBR two; arms extended into five tube-like appendages produced by union of the inside rami of the normal four-armed structure, outside rami absent.
M. sp.: Shimer and Shrock, Index Fossils (1944), Pl. 74.

Melocrinites: Width of the cup is about equal to the height; convex plates of the cup will distinguish this from Arthrocantha.
M. onondaga: LaRocque and Marple, Ohio Fossils (1955), p. 94.

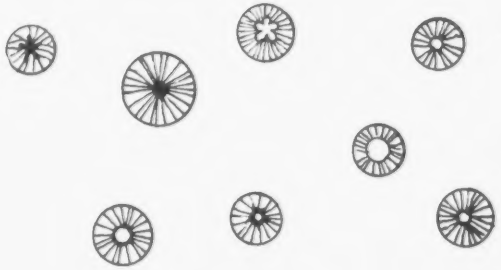


CR3 - Crinoid stem

A crinoid stem (column) is composed of internal disc-shaped structures (columnals). Each columnal has a central opening through which organic material passes. Ligamentous tissue holds these discs together, permitting the bending of the stem. When this tissue and the external flesh of the animal decay the columnals are scattered about. Thus whole crinoid stems are rare fossil finds.

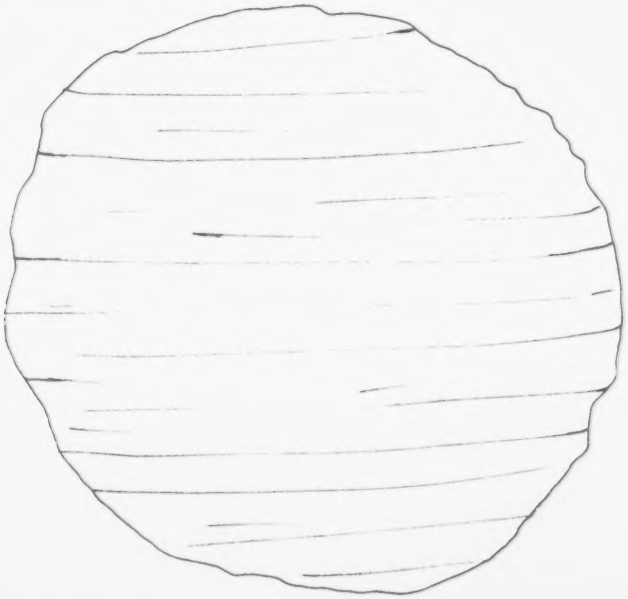
CR4 - Crinoid columnals

The crinoid columnals have fine ridges on their surfaces for articulation, which aid in the bending of the stem. Some of the central holes have an opening like a five-pointed star, which indicates their radial symmetry, and their relationship to starfishes.



SL1 - Stromatolites

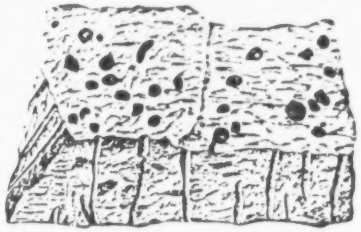
Stromatolites: Stromatolites are organic structures; layered rocks that look like a cabbage head; layers caused by successive growth of thin algal mats, one on top of the other; mats trap sediment, and the algae cause precipitation of the mineral calcite, producing sediment layers that harden into stromatolites. These are considered fossils, even though they are not skeletons of organisms, but simply sedimentary rock layers, produced by the activity of photosynthetic organisms. Lane, Life of the Past (1978), p. 60.

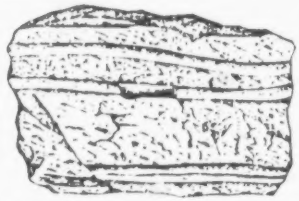


P8 - Clam molds and casts

TF1 - Worm burrows?

Fossils of Class Sipunculoidea (Phylum Annelida) are burrows and burrow fillings which appear to have been made by organisms closely related to modern burrowing marine worms. Some of the burrows are nearly straight holes; others are seimelliptical, and still others are variously curved and contorted. Shimer and Shrock (1944), Pl. 92.





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